137544

ORIGINAL
(Red)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: H & H, Incorporated

DATE: APR 30 1987

FROM: Walter F. Lee
Environmental Scientist (3HW14)

TO: Bonnie Guy
Site Investigation Section (3HW23)

Original work done by the FIT contractor at the subject site indicated the presence of polychlorinated biphenyls. Since there were allegations of dump and burn disposal, it was decided to check the site for dioxins and dibenzofurans.

I have reviewed the results and the QA package for this sampling. Based on that review and the "Interim Policy for Assessing Risks of 'Dioxins' Other Than 2,3,7,8 TCDD" (January 1987), I have concluded that dioxins at the site are present only in quantities of significantly less than 1 part per billion and that there is no 2,3,7,8 - TCDD. In numerous similar situations, TSD facilities have accepted these wastes as "dioxin free" for purposes of disposal. Accordingly, I am returning all of my files to you for whatever other action you may deem appropriate.

AR100279

R-585-10-6-7

A FIELD TRIP REPORT FOR
H & H, INCORPORATED
PREPARED UNDER

TDD NOS. F3-8609-04/8808-01
EPA NO. VA-173
CONTRACT NO. 68-01-7346

FOR THE

HAZARDOUS SITE CONTROL DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

AUGUST 12, 1988

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY	REVIEWED BY	APPROVED BY
ANDREW FREBOWITZ	THOMAS FROMM	GARTH GLENN
ENVIRONMENTAL SCIENTIST	ASSISTANT MANAGER	REG. OPERATIONS MANAGER, FIT 3

TABLE OF CONTENTS

SECTION 1

1.0 INTRODUCTION

1.1 Authorization

NUS Corporation performed this work under Environmental Protection Agency Contract No. 68-01-7346. This specific report was prepared in accordance with Technical Directive Document Nos. F3-8609-04 and F3-8808-01 for the H & H, Incorporated site located in Hanover, Virginia.

1.2 Scope Of Work

NUS FIT 3 was tasked to conduct additional dioxin sampling at the H & H, Incorporated site. Volatile organic analysis (VOA) samples were also obtained at the site.

1.3 Summary

The one-acre site was used exclusively by H & H, Incorporated (Haskell Chemical Company) for the disposal of printing inks, resins, and solvents. Wastes were brought in drums to the site, emptied in a shallow pit, and burned. FIT 3 conducted a site inspection (TDD No. F3-8307-50) of the subject site in March 1984. The inspection revealed the presence of polychlorinated biphenyls (PCBs) and solvents in leachate and sediment samples, as well as organic solvents in a downgradient monitoring well. FIT 3 conducted a dioxin screening at the site on December 3, 1985. Sample results showed elevated levels of dioxin and dibenzofuran isomers in burn pit sediments. HNU readings of 400 ppm were also discovered in the burn pit, making additional VOA sampling and a more extensive dioxin study necessary. This phase of the investigation was conducted on October 9, 1986. VOA sampling concentrated on areas of suspected volatile organic contamination (HNU readings from 30 to 400 ppm). Dioxin and PCB sampling focused on determining the extent of contamination. This was performed by following the solvent dispersion pathway (using HNU screening of airspace of soils collected at various depths from an on-site grid) and sampling at points where HNU readings decreased. Monitoring well samples were obtained for dioxin analysis only. A total of 11 VOA, 21 PCB, and 19 dioxin analog field samples were collected. Quality assurance samples were also prepared for analysis.

SECTION 2

2.0 FIELD TRIP REPORT

2.1 Summary

On Thursday, October 9, 1986, FIT 3 staff members Andrew Frebowitz, Charles Meyer, Thomas Pearce, Michael Snyder, Paul Dietrich, and Michael McCarthy conducted additional sampling at the H & H, Incorporated site in Hanover County, Virginia. Weather conditions during the site visit were cloudy, humid, and warm, with temperatures near 70°F. A total of 11 VOA, 21 PCB, and 19 dioxin analog field samples were collected. Quality assurance samples were also prepared for analysis.

2.2 Persons Contacted

2.2.1 Prior to Field Trip

Werner Henss
Plant Manager
Haskell Chemical Company
6101 Staples Mill Road
Box 9515
Richmond, VA 23228
(804) 266-9677

Walter Lee
U.S. EPA
841 Chestnut Building
Ninth and Chestnut Streets
Philadelphia, PA 19107
(215) 597-6623

2.2.2 At the Site

Werner Henss
Plant Manager
Haskell Chemical Company
6101 Staples Mill Road
Box 9515
Richmond, VA 23228
(804) 266-9677

Walter Lee
U.S. EPA
841 Chestnut Building
Ninth and Chestnut Streets
Philadelphia, PA 19107
(215) 597-6623

TDD Number F3-8609-04
EPA Number VA-173

2.3 **SAMPLE LOG**

Site Name H+H Inc.

NOTE: VOA ANALYSIS ONLY

TRAFFIC REPORTS Organic	Inorganic	High Hazard	SAMPLING LOCATION	PHASE	SAMPLE DESCRIPTION	DATE	TIME	pH	COMMENTS/OBSERVATIONS	LABORATORY
CC991			BP1-A	SOLID	AUGER FROM BURN PIT: 1.5'	10/9/86	1145		HNU: 30 ppm	VERSAR
CC992			BP1-B		BURN PIT AUGER: 2.5 FT.		1200		HNU: 350 ppm	
CC993			BP2-A		BURN PIT AUGER: 1'6"		1145		HNU: 300 ppm DUPLICATE TO CC994	
CC994			BP2-AD		"		1145		DUPLICATE TO CC993	
CC995			BP2-B		BURN PIT: 2.5 FT.		1200		HNU: 350 ppm	
CC996			R2-A		AREA WEST OF PIT AUGER: 1.5 FT		1347		HNU: 50 ppm	
CC998			R1-A		AREA WEST OF PIT AUGER: 1 FOOT		1355		HNU: 300 ppm	
CC999			R1-B		AREA WEST OF PIT AUGER: 3 FEET		1420		HNU: 150 ppm	
CF430			BACKGROUND		BACKGROUND		0915		BACKGROUND	
CF433			BLANK		BLANK		1518		BLANK	
CF412			S-2		WEST END SOILS: AUGER: 2 FEET		1712		HNU: 20 ppm	
CF413			S-3		WEST END SOIL: AUGER: 2 FEET		1707		HNU: 30 ppm	
CF414			S-4		WEST END SOIL AUGER: 1-5 FEET		1717		HNU: 60 ppm	

AR102286

2.4 Site Observations

- The site is accessed by a dirt road from Route 33 (see figure 1, appendix B).
- The site is approximately one acre in size and it is circular in shape (see figure 2, appendix B).
- The site slope is one to three percent to the west.
- A one- to two-feet-high earthen berm surrounds the site.
- The soil is sand and clay and is subject to erosion. Numerous runoff paths were observed that flowed to a major runoff channel at the western end of the site. Very little vegetation is on site.
- The burn pit, as pointed out by Werner Henss, of the Haskell Chemical Company, is approximately 30 feet in diameter and is located in the central portion of the site(see figure 2, appendix B).
- HNU readings from 30 to 400 ppm above the 1 ppm background were detected in burn pit auger holes at depths from 1 to 10 feet. HNU readings up to 60 ppm were also detected at depths of two feet in soils west of the pit.
- Remnants of the road used to bring in wastes separates the burn pit from the western portion of the site.
- The site was not actively leaching at the time of the sampling.
- No mini-alert readings above background were recorded.

Descriptions of each sample location are as follows (see figure 3, appendix B):

Burn Pit

- o Sample Location: BP1
  - VOA and PCB samples BP1-A were obtained at 1.5 feet in depth. The HNU reading was 30 ppm. The soil was a grayish-brown sand.
  - VOA and PCB samples BP1-B were obtained at a depth of 2.5 feet. The HNU reading was 350 ppm. The soil was a brown sand.
  - The HNU reading at 4 feet, 10 inches was 200 ppm. The soil was a light gray sand. Refusal was reached at this point; dioxin and PCB samples were collected.
- o Sample Location: BP2
  - A VOA and PCB sample was obtained at a depth of 1.5 feet (BP2-A). The HNU reading was 300 ppm. Duplicate samples were also obtained from this location. Soils were a grayish-brown sandy clay.
  - Samples BP2-B are for VOAs and PCBs. The HNU reading at this 2.5-foot depth was 380 ppm. Soils did not change at this depth.
  - The HNU reading of airspace from soils taken at four feet was 350 ppm. Soils were unchanged; however, a purple stain was observed.
  - The HNU reading at six feet was 300 ppm; soils were unchanged.
  - The HNU reading at 7.5 feet was 20 ppm; soils were unchanged.
  - Dioxin and PCB samples were obtained at 10.0 feet in depth. The soil was a greenish-brown sandy clay. The HNU reading was 110 ppm. This hole was completed at this depth.

Monitoring Wells (MWs)

- o MW no. 1 (see figure 3, appendix B)
  - The well is constructed of two-inch diameter polyvinyl chloride (PVC) pipe inside a four-inch steel casing with three inches of stickup.
  - The depth to water was 16 feet, 7 inches below ground surface (B.G.S.). The depth of the well was 20 feet B.G.S. A total of three feet, seven inches of standing water was in the well; one volume was 0.5 gallon. Two volumes (one gallon) were purged, at which point the well was bailed dry. A sample was obtained after recharge; this sample was heavy with suspended solids.
  - MW no. 1 is located approximately 15 feet south of the access road and 300 feet east of the site.
  - No HNU readings above background were recorded.
- o MW no. 2 (see figure 3, appendix B)
  - MW no. 2 is constructed similar to MW no. 1, except for a six-inch stickup.
  - No HNU readings above background were recorded.
  - The depth to water was 9 feet, 6 inches B.G.S.; the well depth was 15 feet, 1 inch B.G.S. One volume was equivalent to one gallon. Three volumes were purged and a sample was obtained.
  - The sample contained suspended solids.

Western Area Samples (see figure 3, appendix B)

- o R1
  - This location was 10 feet west of the road used to bring wastes to the burn pit and approximately 30 feet west of BP2.

- The HNU reading at a depth of one foot was 300 ppm. Samples for VOAs, PCBs, and dioxins (R1-A) were obtained.

- Soils were sand, stained with red pigment from one to two feet in depth.

- The headspace HNU reading at three feet was 150 ppm. The soil at this depth was grayish-brown sand. VOA, PCB, and dioxin samples were obtained (R1 -B).

- The HNU reading at four feet was 120 ppm. The soil was a brownish-gray sandstone. Refusal was reached at this point.

o R2

- This location was approximately 20 feet south of R1 and 30 feet west of BP1, on the west side of the burn pit road.

- VOA, PCB, and dioxin samples (R2-A) were collected at a depth of one foot. The HNU reading was 50 ppm.

- No HNU readings above background were recorded in headspace samples at the three feet refusal point. Dioxin and PCB samples were obtained.

- Soils were a brownish-gray sand from the surface to three feet.

Runoff Channel (RO)

o An auger sample at 1.5 feet in depth was obtained in the major runoff channel. Soil was a brown sandy-clay. No HNU readings above background were recorded. Dioxin and PCB samples were collected.

S1 through S4

o General Observations

- These samples were obtained on a line running north-south at a midpoint between the burn pit and western end of the site. Sample locations are approximately 20 to 25 feet apart.

- S1
  - This location is at the northern end of the S1 through S4 line (see figure 3, appendix B).
  - No HNU readings above background were recorded.
  - Soil was a brown sand. A dioxin and PCB sample was obtained at a two-foot depth.
- S2
  - S2 is located 25 feet south of S1.
  - The HNU reading was 20 ppm at a depth of two feet.
  - Soils were a grayish-brown sand.
  - Dioxin, PCB, and VOA samples were obtained.
- S3
  - S3 was located 20 feet south of S2.
  - Soils at a depth of two feet were grayish-brown sand.
  - The HNU reading was 20 ppm at two feet.
  - VOA, dioxin, and PCB samples were collected at the two-foot depth.
- S4
  - S4 was located 20 feet south of S3.
  - Soils at a 1.5 feet in depth were a grayish-brown sand.

- The HNU reading at 1.5 feet was 60 ppm.

- Dioxin, PCB, and VOA samples were obtained at 1.5 feet.

Perimeter Samples

o General

- All perimeter samples, with the exception of P5, were surface samples (two through six inches). P5 was an auger sample two feet in depth.

- Dioxin and PCB samples only were obtained.

- Soils at all perimeter locations were a brown sand.

- No HNU readings above background were recorded at any location.

o P1

- This location was approximately 75 feet north of the berm pit over the bermed site perimeter.

o P2

- P2 was obtained immediately east of the hay bales placed to control runoff.

o P3

- P3 was located outside the berm at the northwestern corner of the site.

o P4

- This location was obtained outside the berm at the southwestern corner of the site.

- o P5
  - P5 was a two-foot auger sample collected from the runoff channel outside the western end of the site.
- o P6
  - This surface sample was located in the runoff channel approximately 30 feet west of P5.

Background

- o The background sample was collected outside the tree line near the entrance to the access road.

2.5 PHOTOGRAPH LOG

Photo 1 Monitoring well #2

Photo 2 Sample location: BP1

8609-04
VA-173
M+H Inc.

RIP1
photo 1

Monitoring Well No. 2

10/9/86

0858

A. Freebourn

8609-04
VA-173
M+H Inc.

RIP4
photo 2

Sample Location : BP1

10/9/86

1145

for
T. Pearce

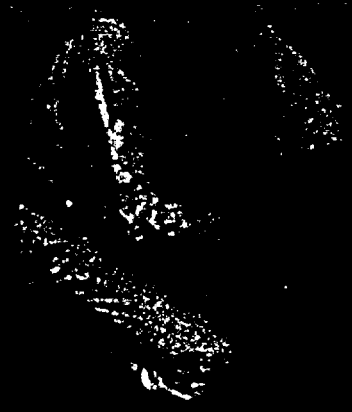


Photo 3 Sample location: BP2

Photo 4 Sample Location: R1

8609-04
VA-173
H+H Inc.

RIP5
Photo 3

Sample Location: BP2

10/9/86 1145

for
T. Pearce

H+H
8609-04
VA-173

RIP8
Photo 4

Sample Location : R1

10/9/86 1347

Chuck Heyer

AR100297

AR100297

Photo 5 Sample location: R2

Photo 6 Sample location: R01

AR100298

H+H
8609-04
VA-173

RIP7
photo 5

Sample Location: R2

10/9/86

1321

C. Meyer

8609-04
VA-173
H+H

RIP11
photo 6

Sample Location: R01

10/9/86

1522

for
T. Pearce

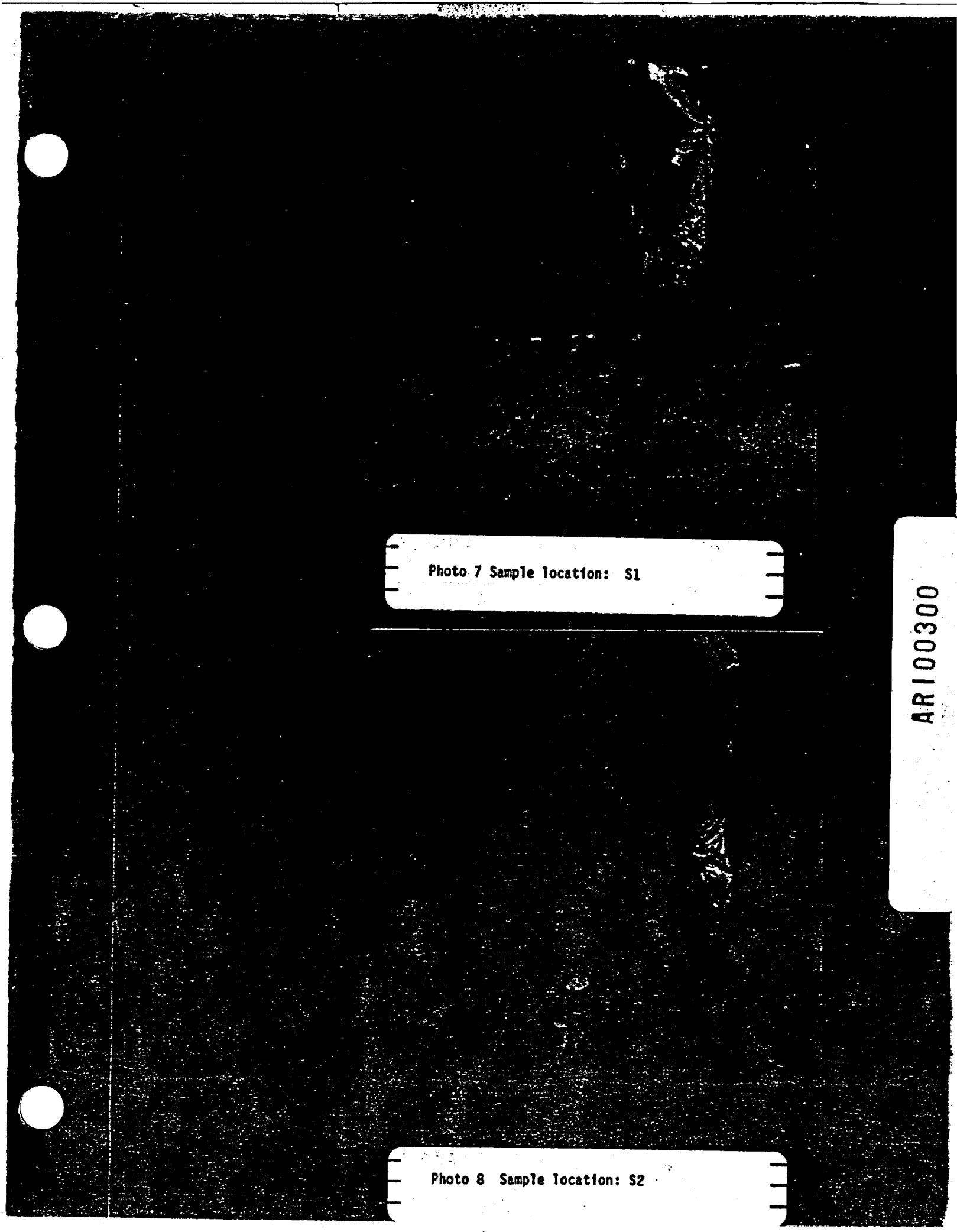


Photo 7 Sample location: S1

Photo 8 Sample location: S2

H+H
8609-04
VA-173

RSP5
photo 7

Sample Location: S1

1/9/86

1705

Michael McCarthy
Mike McCarthy

H+H
8609-04
VA-173

RSP7
photo 8

Sample Location: S2

1/9/86

1712

Michael McCarthy
Mike McCarthy

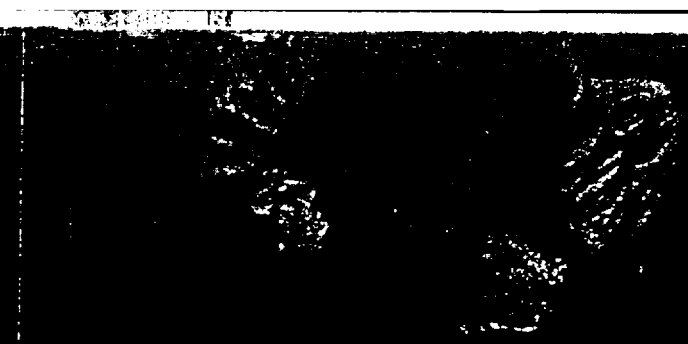


Photo 9 Sample location: S4

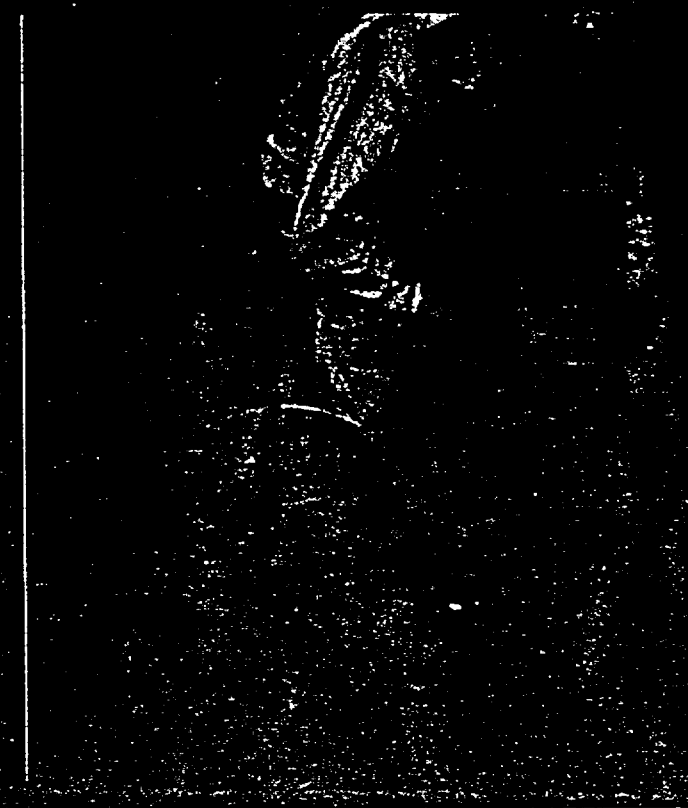


Photo 10 Sample location: P1

H+H
8609-04
VA-173

R2P9
photo 9

Sample Location: SY

10/9/86

1717

Mike McCarthy
Mike McCarthy

H+H
8609-04
VA-173

R1P9
photo 10

Sample Location: P1

10/9/86

1575

for
T. Pearce

AR100303

Photo 11 Sample location: P2

Photo 12 Sample location: P5

AR100304

MH
8609-04
UA-173

R1P6
photo 11

Sample Location: P2

10/9/96

15/E

for
T. Pierce

MH
8609-04
UA173

R2P3
photo 12

Sample Location: P5

10/9/96

16/F

Mike Snyder

Photo 13 Sample location: P6

H+H
8609-04
VA-173

RIPY
photo 13

Sample Location : P6

10/9/86

1620

Mike Snyder

APPENDIX A

1. COST CENTER:	REM/FIT ZONE CONTRACT TECHNICAL DIRECTIVE DOCUMENT (TDD)	2. NO.:
ACCOUNT NO.:		F3-8609-04

3. PRIORITY:	4. ESTIMATE OF TECHNICAL HOURS:	5. EPA SITE ID:	6. COMPLETION DATE:	7. REFERENCE INFO.:
☒ HIGH ☐ MEDIUM ☐ LOW	250	VA-173	10/17/86	☒ YES ☐ NO ☐ ATTACHED ☒ PICK UP
	4A. ESTIMATE OF SUBCONTRACT COST:	5A. EPA SITE NAME: H & H Inc. Hanover, VA		

8. GENERAL TASK DESCRIPTION: Perform additional dioxin sampling at the subject site (enforcement support

9. SPECIFIC ELEMENTS:

1.) Review background information, refer TDD F3-8510-29
2.) Prepare & submit sampling plan to EPA for approval.
3.) Arrange for site access.
4.) Coordinate lab analysis & arrange for spiked samples through EPA.
5.) All sampling to be performed acording to the most recnet dioxin protocol as written by EPA Region VII.
6.) Maintain chain of custody for all samples. Document all sampling and related activities.
7.) Drum for proper disposal all contaminated clothing & materials, EPA will handle disposal & labeling requirements
8.) Prepare & submit field trip report & photo documentation.
9.) All work on this project to be performed according to: WP-SI-1, Rev.1

10. INTERIM DEADLINES:

11. DESIRED REPORT FORM: FORMAL REPORT ☒ LETTER REPORT ☐ FORMAL BRIEFING ☐

OTHER (SPECIFY): Coordinate all activities with Walter Lee

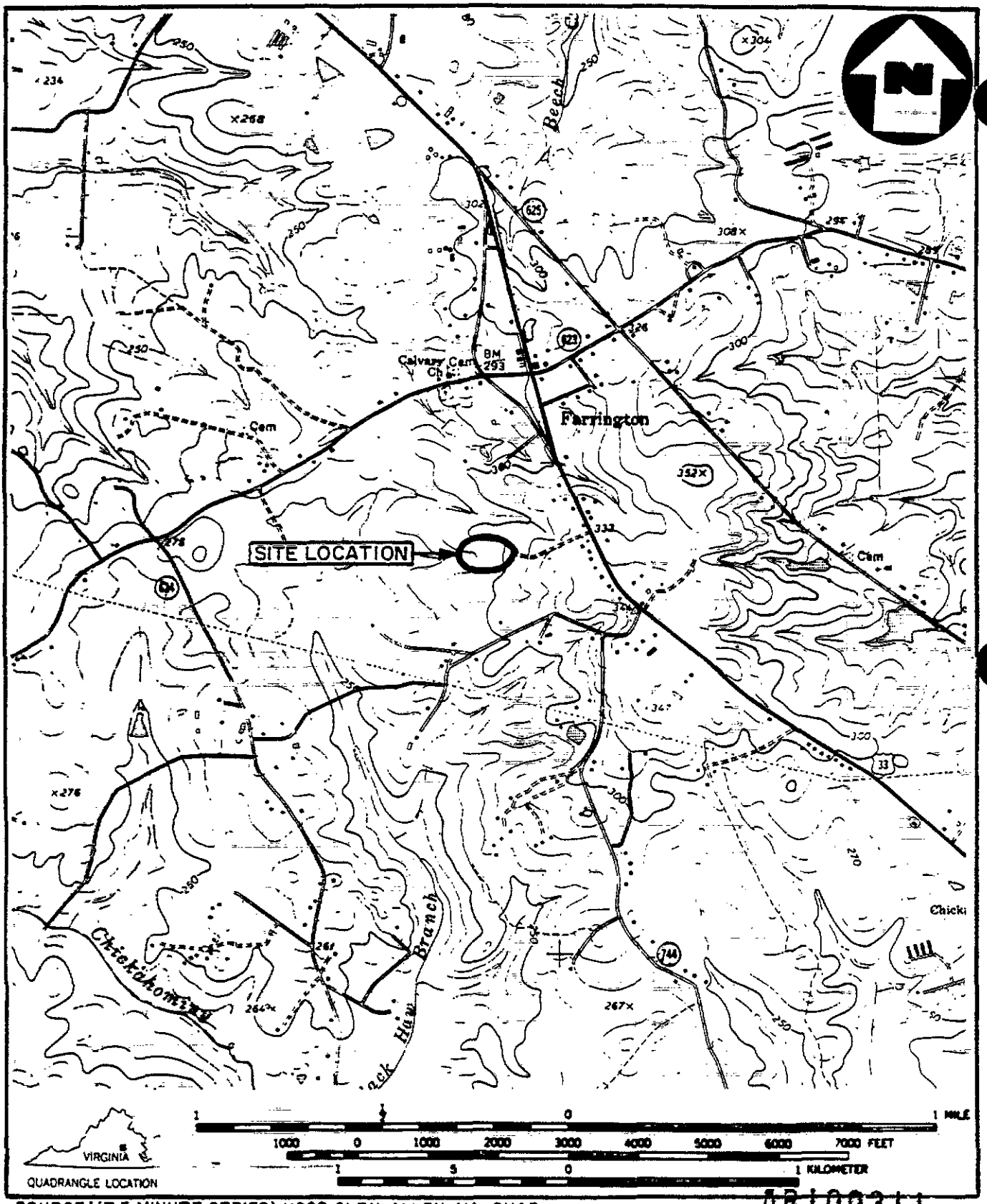
12. COMMENTS: State Code 051 County Code 085

13. AUTHORIZING RPO: (SIGNATURE)	14. DATE:
15. RECEIVED BY: ☐ ACCEPTED ☐ ACCEPTED WITH EXCEPTIONS ☐ REJECTED (CONTRACTOR RPM SIGNATURE)	16. DATE:

AR 100309

Sheet 1 White – FITL Copy
Sheet 2 Canary – DPO Copy
Sheet 3 Pink – Contracting Officer's Copy (Washington, D. C.)
Sheet 4 Goldenrod – Project Officer's Copy (Washington, D. C.)

APPENDIX B



SOURCE: (7.5 MINUTE SERIES) USGS GLEN ALLEN, VA. QUAD.

AR100311

FIGURE 1

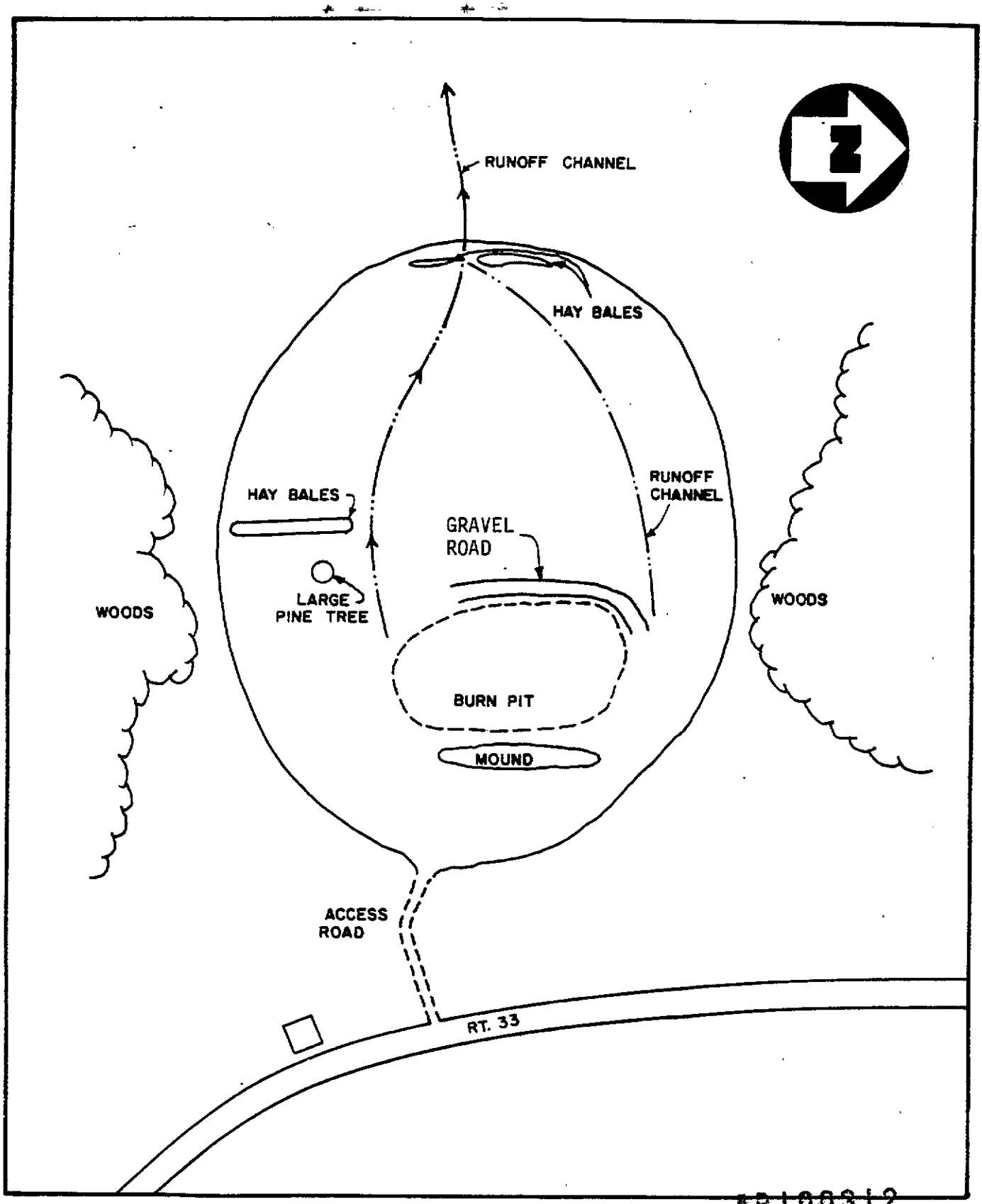
SITE LOCATION MAP

H & H INC., FARRINGTON, VA.

SCALE 1:24000

NUS CORPORATION

A Halliburton Company



AR100312

FIGURE-2

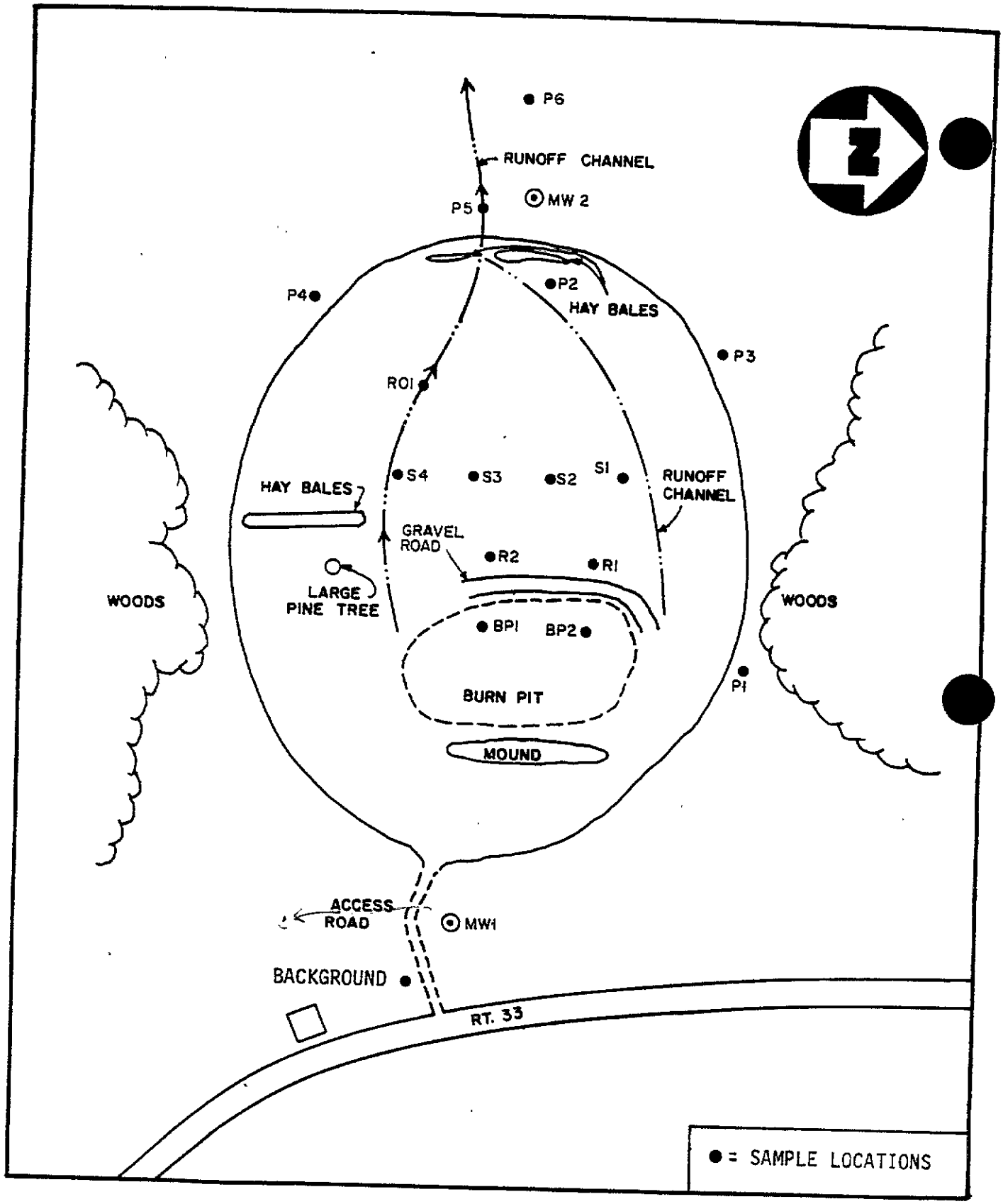
SITE SKETCH

H&H INC., FARRINGTON, VA.

(NO SCALE)

NUS CORPORATION

A Halliburton Company



SAMPLE LOCATION MAP:

H & H INC., FARRINGTON, VA.

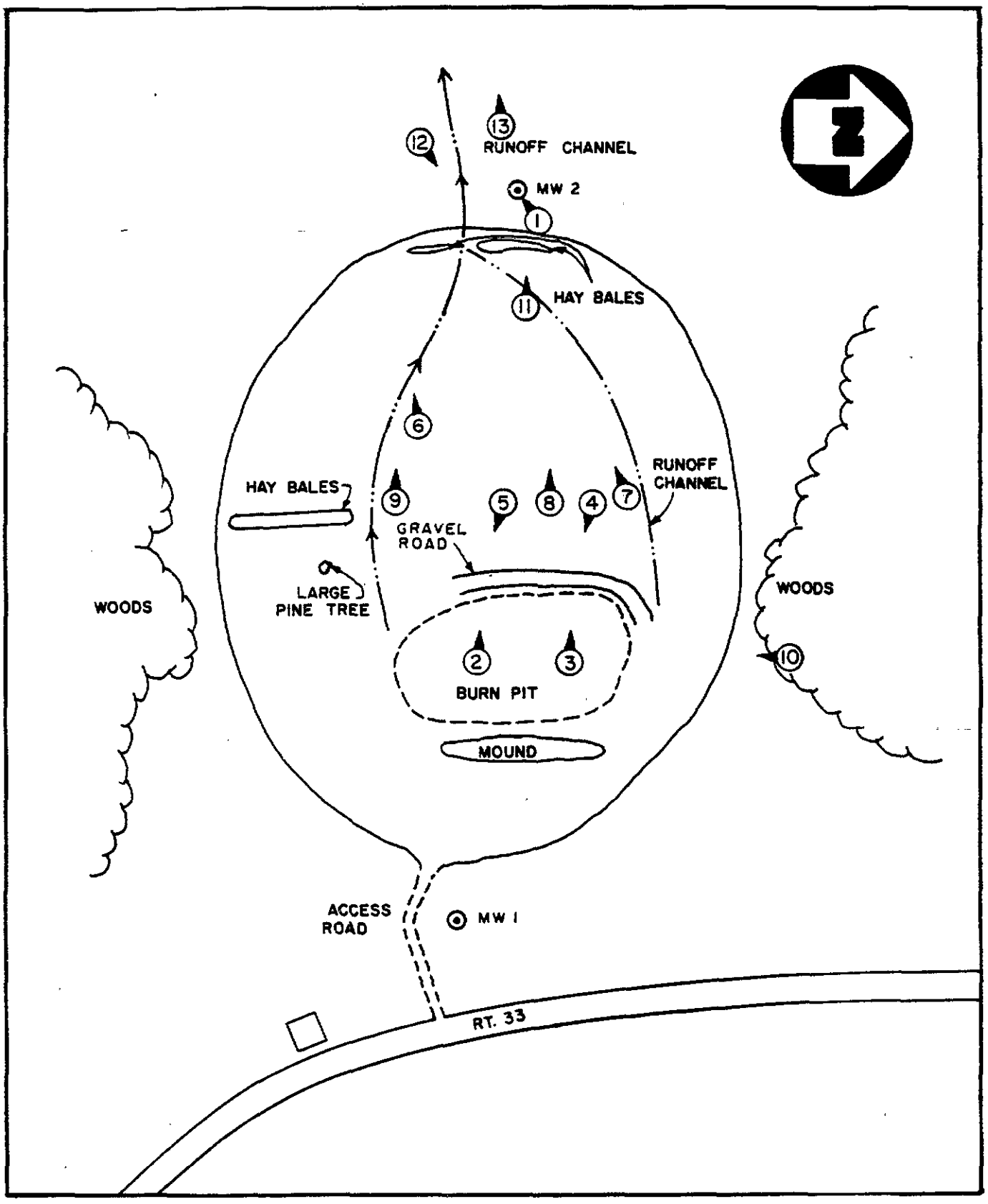
(NO SCALE)

FIGURE-3

AR100313

NUS CORPORATION

A Halliburton Company



FIGURE

PHOTO LOCATION MAP
H&H INC., FARRINGTON, VA.
(NO SCALE).

NUS CORPORATION

APPENDIX C

6.0 LABORATORY DATA

6.1 Sample Data Summary

The attached data summary contains only compounds which were identified as detected in at least one sample. The complete list of compounds analyzed for, their results, and the associated detection limits are located as an appendix. The following codes are used in the data summary to indicate the confidence in these positive results:

◊	This concentration reported by laboratory, but evidence to doubt presence of compound/element (may or may not be present).
J	Approximate value; detected below limit of accurate quantitation.
UF	The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit.
F	The associated numerical value is an estimated quantity because quality control criteria were not met. (See Quality Assurance Review for specifics as to magnitude or direction of variability or bias.)
R	Quality Control indicates that data are unusable (compounds may or may not be present). Resampling and/or reanalysis is necessary for verification.
N	Evidence for presence of material is presumptive (tentative identification).
H	*Suspected Unreliable Results: Even though data validation criteria have* been met, this result may still be suspect because false positives are a frequent problem with this particular compound or method of analysis. To prove validity, corroboration with additional analytical results or supporting information would be recommended.

TDD Number T2-3649-04

EPA Number VA-115

SAMPLE DATA SUMMARY
TARGET COMPOUNDS

☒ Organic ☐ Inorganic

Site Name H+H Inc

Date of Sample 10/19/86

Compounds Detected

Sample Number	Sample Description and Location	Phase	Units	Acetone	2-Butanone	1,1,2-Trichloro-1,2,2-trifluoroethane	4-Methyl-2-pentanone	Tetrachloroethene	Toluene	Ethylbenzene	Total Xylenes	Methylene chloride					Remarks
CF411	BP1-A	Soil	ug/kg	UF ◇ 11000 J	UF ◇ 3500				UF ◇ 770 J	1600	19,000						ALL SAMPLES FOR VOA ONLY
CF412	BP1-B	Soil	ug/kg	UF ◇ 69,000 J		21,000 J			2.2×10⁵	28,000	18×10⁵						ALL SAMPLES MEDIUM LEVEL UNLESS OTHERWISE NOTED
CF413	BP2-A	Soil	ug/kg	UF ◇ 130,000 J		60,000 J		44,000 J	5.2×10⁵	70,000 J	61,000						
CF414	BP2-AD	Soil	ug/kg	UF ◇ 150,000		72,000 J		47,000 J	4.3×10⁵	66,000 J	501,000						DUPLICATE OF BP2-A
CF415	BP2-B	Soil	ug/kg	UF ◇ 47,000 J		31,000 J	52,000 J	15,000 J	1.8×10⁵	31,000 J	212,000						
CF416	R2-A	Soil	ug/kg	UF ◇ 1.2×10⁶ J		763,000 J	85,000 J		28.7×10⁵	616,000 J	4.1×10⁶						
CF418	R1-A	Soil	ug/kg	UF ◇ 25,000	UF ◇ 4,000	220 J		400 J	7000	930	21,000						
CF444	R1-B	Soil	ug/kg	UF ◇ 21					14	4 J	55 F	UF ◇ 1 J					LOW LEVEL
CF430	BACKGROUND	Soil	ug/kg	7 J		4 J		4 J	120	5 J	22 F	UF ◇ 1 J					LOW LEVEL
CF433	BLANK	Soil	ug/kg						1 J								FIELD BLANK LOW LEVEL
CF412	S-2	Soil	ug/kg	UF ◇ 2500	UF ◇ 400				7300	390	3900						
CF413	S-3	Soil	ug/kg	13 F	UF ◇ 75	100	52	4 J	330	36	340 F	UF ◇ 3 J					LOW LEVEL
CF414	S-4	Soil	ug/kg	UF ◇ 1,200	UF ◇ 840	1400	2300	170 J	760	86	860	UF ◇ 130 J					

NOTE: For a re[illegible] this data and non-target, tentatively identified compounds, please see [illegible] alytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

AR100317

6.2 Quality Assurance Review

6.2.1 Organic Data: Lab Case 6479

6.2.1.1 Summary

Thirteen solid samples were analyzed through the EPA Contract Laboratory Program (CLP) routine analytical services for volatiles only. Nine of these samples were run medium level, and the remainder (including the field blank) were analyzed as low-level samples. The sample set also included one field duplicate.

The laboratory data have been fully reviewed to determine the usability of the results (areas examined in detail are listed in the Support Documentation appendix). In general, analyses were performed acceptably with only a few problems requiring modification or qualification of the reported results.

The primary area of concern in this data package was blank contamination. This led to the qualification of acetone, 2-butanone, and methylene chloride results as qualitatively questionable (designated with a UF ◊ on the sample data summary). It should be noted that several of these samples revealed extremely high concentrations of some solvents, primary xylenes and toluene, which necessitated considerable dilution. Consequently, some very high concentrations of acetone have been qualified as questionable. In addition, holding times for a few samples were exceeded due to delays incurred as a result of dilution and reanalysis. However, this is expected to affect only one sample result (acetone in sample CF413).

6.2.1.2 Qualifiers

It is recommended that this data package be utilized only with the following qualifier statements:

- The presence of the following compounds is qualitatively questionable; data contain direct evidence to doubt their presence:

Compounds	Samples with Questionable Results
methylene chloride	All samples with positive results
acetone	All samples with positive results, except CF413
2-butanone	All samples with positive results
toluene	CC991

These compounds were detected in laboratory and/or field blanks at levels sufficient to question the aforementioned sample results. It should be noted that some of these results for common laboratory contaminants have been multiplied by large dilution factors resulting in values far greater than the instrument level of contamination. (See the Support Documentation appendix, pages 2 to 3, for the blank analysis results for target compounds.)

- Detection limits for 2-butanone and 2-chloroethylvinyl ether may be higher than reported in all samples analyzed. This is a result of low response factors (below 0.05) observed for these compounds in all standards associated with this data package. Such low response factors indicate a difficulty in seeing a particular compound, hence the effect on detection limits. Positive results for 2-butanone, which have been designated as questionable, may actually be higher but are otherwise unaffected. (See the Support Documentation appendix, pages 13 to 19, calibration data.)

- Sample CC999 (a low-level solid) was analyzed three times including the matrix spike and matrix spike duplicate analysis. As a result of poor correlation in the total xylene results between these three analyses, all low-level total xylene results (samples CC999, CF413, and CF430) should be considered estimated (may be different). (For further explanation, please see the support data section.)

- A number of samples were analyzed 11 days following sampling. As a result, some of the lighter compounds may have escaped due to the delay. Consequently, the acetone result reported for sample CF413 should be considered estimated (may be higher). (See the Support Documentation appendix, page 20, and compare the sampling date on the sample data summary.)

6.2.1.3 Support Data

The total xylene results for sample CC999 were inconsistent when compared to the matrix and matrix spike duplicate results. The observed numbers were 55, 29, and 25 ug/kg, which results in a calculated relative standard deviation (RSD) of 45 percent. Although these inconsistencies may be the result of inhomogeneity inherent in solid samples, the RSD is high enough to warrant the qualification of all low-level xylene results as estimated. (See the Support Documentation appendix, pages 9 to 12, for total xylene results.)

Report prepared by Eric L. Blischke
(215) 687-9510

Date: November 24, 1986

AR100320

SAMPLE DATA SUMMARY: ORGANIC TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NUMBER	ANALYSIS FRACTION (VOA/BNA)	ESTIMATED CONCENTRATION VALUE	ESTIMATED CONCENTRATION UNITS	QUALIFIER CODE	COMPOUND NAME
CC991	VOA				NO TIC FOUND
CC992	VOA				NO TIC FOUND
CC993	VOA				NO TIC FOUND
CC994	VOA				NO TIC FOUND
CC995	VOA				NO TIC FOUND
CC996	VOA				NO TIC FOUND
CC998	VOA	350	ug/kg		SAT'D HYDROCARBON
CC999	VOA				NO TIC FOUND
CF412	VOA	250	ug/kg	ISO	TRANS-1,4-DIMETHYL CYCLOOCTANE
↓	↓	100	ug/kg	UNK	UNKNOWN
CF413	VOA	15	ug/kg	ISO	2-PENTANOL
CF414	VOA	1600	ug/kg	ISO	2-PENTANOL
CF450	VOA				NO TIC FOUND

DEFINITIONS OF QUALIFIER CODES:

SUS = SUSPECTED FALSE POSITIVE RESULT: Compound is either a common laboratory contaminant, or else a possible reaction byproduct (artifact) attributable to the chemical reagents used for sample preparation and analysis. This result is suspect even though this compound was not found in any associated blanks.

UNK = UNKNOWN COMPOUND: Library search result unreasonable or of very low matching quality.

TOT = TOTAL CONCENTRATION REPORTED: Represents the sum of several compounds detected all belonging to the same chemical class.

ISO = OR ISOMER: Compound identification is not selective for this isomer only. This result may instead represent the presence of a similar compound comprised of the same atoms bonded together in a different arrangement or substitution pattern.

AR100321

PROJECT NAME: H-H
TDD NO: F5-8609-04 (SAMPLING)

EPA SITE NO.: VA-173
REGION: III

QUALITY ASSURANCE REVIEW OF ORGANIC ANALYSIS LAB DATA PACKAGE

Case No.: 1479
Contract No.: VERSAR
Contract Laboratory: 68-01-7082
Applicable IFB No.:
Reviewer: ERIC BLISCHKE
Review Date: 11/21/86

Applicable Sample No's.: CC991 - CC996, CC998, CC999, CF412 - CF414, CF430, CF433

The organic analytical data for this case has been reviewed. The quality assurance evaluation is summarized in the following table:

Reviewer's Evaluation*	Fraction				
	VOLATILES	ACIDS	BASE/ NEUTRALS	PCB/ PEST.	TCDD
Acceptable		N.R.	N.R.	N.R	N.R.
Acceptable with exception(s)	X 1,2,3,4				
Questionable					
Unacceptable					

* Definitions of the evaluation score categories are listed on next page.

evaluation was based upon an analysis of the review items indicated below:

- ∓ ● DATA COMPLETENESS
- 1 ● BLANK ANALYSIS RESULTS
- ∓ ● SURROGATE SPIKE RESULTS
- ∓ ● MATRIX SPIKE RESULTS
- 2 ● DUPLICATE ANALYSIS RESULTS
- ○ EVALUATION OF CONFIRMATIONS
- ◒ QUANTITATIVE CALCULATIONS
- ∓ ● TARGET COMPOUND MATCHING QUALITY
- ∓ ● TENTATIVELY IDENTIFIED COMPOUNDS
- 3 ● CHROMATOGRAPHIC SENSITIVITY CHECKS
- ∓ ● DFTPP AND BFB SPECTRUM TUNE RESULTS
- ∓ ● STANDARDS
- ∓ ● CALIBRATION CHECK STANDARDS
- 4 ● HOLDING TIMES

Data review forms are attached for each of the review items indicated above.

∓ No errors noted, no form attached.

◒ Spot Check performed.

Comments:

AR100322

(1)

BLANK ANALYSIS RESULTS FOR TARGET COMPOUNDS

FRACTION	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
VOA		LOW	SOIL	BA5977	LAB	$MeCl_2$ (3/5 ug/kg) ACETONE (7/10 ug/kg)
VOA		LOW	SOIL	BA6052 (METHANOL RB)	LAB	ACETONE (10/10 ug/kg) 2-BUTANONE (20/10 ug/kg)
VOA		~~LOW~~ MED	SOIL	BA6066 (low/med METH)	LAB	$MeCl_2$ (2/5 ug/kg) × 50 100 ACETONE (14/10 ug/kg) × 50 700 2-BUTANONE (35/10 ug/kg) × 50 1750 TOLUENE (3/5 ug/kg) × 50 150
VOA		MED	SOIL	BA6071 (low/med Meth)	LAB	$MeCl_2$ (1/5 ug/kg) × 50 50 ACETONE (19/10 ug/kg) × 50 950 2-BUTANONE (31/10 ug/kg) × 50 1550
VOA		MED	SOIL	BA6078 (low/med meth)	LAB	ACETONE (14/10 ug/kg) 2-BUTANONE (31/10 ug/kg)
VOA		MED	SOIL	BA6084 (low/med Meth)	LAB	$MeCl_2$ (1/5 ug/kg) ACETONE (21/10 ug/kg) 2-BUTANONE (47/10 ug/kg) TOLUENE (2/5 ug/kg)
VOA		MED	SOIL	BA6089	LAB	ACETONE (24/10 ug/kg) 2-BUTANONE (45/10 ug/kg)
VOA		MED	SOIL	BA6097	LAB	ACETONE (17/10 ug/kg) 2-BUTANONE (36/10 ug/kg)
VOA		MED	SOIL	BA6112	LAB	ACETONE (18/10 ug/kg) 2-BUTANONE (55/10 ug/kg)
OA		LOW	SOIL	BA6113	LAB	ACETONE (5/10 ug/kg)

ABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN THE AMPLE ANALYTICAL DATA SUMMARY. TENTATIVELY IDENTIFIED COMPOUNDS IN BLANKS ARE LISTED ON A SEPARATE FORM.

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM QUANTITATION LIST, DIAGNOSTICS, CHROMATOGRAM AND/OR SPECTRA.

BLANK ANALYSIS RESULTS FOR TARGET COMPOUNDS

FRACTION	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
CF433		LOW	SOIL	CF433 (FIELD BLK)	NUS	TOLUENE (1/5 ug/kg)

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN THE SAMPLE ANALYTICAL DATA SUMMARY. TENTATIVELY IDENTIFIED COMPOUNDS IN BLANKS ARE LISTED ON A SEPARATE FORM.

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM QUANTITATION LIST, DIAGNOSTICS, CHROMATOGRAM AND/OR SPECTRA.

(3)

BLANK ANALYSIS RESULTS FOR TENTATIVELY IDENTIFIED COMPOUNDS

ALL TENTATIVELY IDENTIFIED COMPOUNDS FOUND IN BLANK ANALYSES ARE LISTED BELOW:

SAMPLE #	FRACTION	SCAN #(S)	SPECTRUM MATCH INDICES				ESTIMATED CONCENTRATION	COMPOUND NAME	COMMENTS
			TYPE	SCORE	TYPE	SCORE			
BA5977	VOA	67-130					BROAD PEAK HT. 10% IS	UNKNOWN	
↓	↓	473					2% IS	UNKNOWN	
BA6062	VOA	125					6 ug/kg	UNKNOWN	
↓	↓	67					10% IS	UNKNOWN	BROAD PEAK
BA6066	VOA	63					10% IS	UNKNOWN	BROAD PEAK
		131					7 ug/kg x 50	UNKNOWN	
		159					3% IS	UNKNOWN	
		342					2% IS	UNKNOWN	
		370					3% IS	UNKNOWN	
		405					2% IS	UNKNOWN	
		603					3% IS	UNKNOWN	
↓	↓	778					4 ug/kg x 50	UNKNOWN ALKANE	
BA6071	VOA	69					10% IS	UNKNOWN	BROAD PEAK
		129					6 ug/kg x 50	UNKNOWN	
		341					2% IS	UNKNOWN	
		370					2% IS	UNKNOWN	
↓	↓	405					2% IS	UNKNOWN	
BA6078	VOA	69					10% IS	UNKNOWN	BROAD PEAK
		128					5 ug/kg x 50	UNKNOWN	
↓	↓	373					2% IS	UNKNOWN	
BA6084	VOA	68					10% IS	UNKNOWN	
		152					5 ug/kg	UNKNOWN	
		372					3% IS	UNKNOWN	
↓	↓	403					2% IS	UNKNOWN	
↓	↓	160					3% IS	UNKNOWN	
BA6089	VOA						SAME AS PREVIOUS		
BA6097	VOA						SAME AS PREVIOUS		
BA6102	VOA						SAME AS PREVIOUS		
BA6113	VOA	68-125					10% IS	UNKNOWN	BROAD PEAK
CF433	VOA	50-125					10% IS	UNKNOWN	BROAD PEAK

SOIL SURROGATE PERCENT RECOVERY SUMMARY

Case No. 6479 BH11 Contract Laboratory VERSAR INC. Contract No. 68-01-7082

Low _____ Medium ✓

	VOLATILE			SEMI-VOLATILE								PESTICIDE
SMO TRAFFIC NO.	TOLUENE-D8 (81-117)	BFB (74-121)	1,2 DICHLOROETHANE-D4 (70-121)	NITROBENZENE-D5 (23-120)	2-FLUOROBIPHENYL (30-115)	TERPHENYL-D14 (18-137)			PHENOL-D6 (24-113)	2-FLUOROPHENOL (25-121)	2,4,6 TRIBROMOPHENOL (19-122)	DIBUTYLCHLORENDATE ** (20-150)
✓ RBBA6066	103	100	79			NOT REQUIRED						
✓ RBBA6071	104	101	91									
✓ RBBA6078	104	98	84									
✓ RBBA6084	103	99	88									
✓ RBBA6089	104	100	88									
✓ RBBA6097	106	100	85									
✓ RBBA6112	102	104	88									
CC991	101	103	92									
CC991MS	97	101	101									
CC991MSD	95	99	101									
CC995	107	102	100									
CC993	110	106	100									
CC998	107	105	102									
CC994	106	108	108									
CC996	106	106	110									
CC992	105	108	111									
CCA12	100	107	100									
CCA14	102	109	99									

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

** ADVISORY LIMITS ONLY

Volatiles: 0 out of 54 ; outside of QC limits

Semi-Volatiles: NR out of NR ; outside of QC limits

Pesticides: NR out of NR ; outside of QC limits

7/85

Comments: NR = NOT REQUIRED

100008

AR100326

SDG 326

SOIL SURROGATE PERCENT RECOVERY SUMMARY

Case No. GA79 BH11 Contract Laboratory VERSAR INC. Contract No. 68-01-7082

Low ✓ Medium _____

	VOLATILE			SEMI-VOLATILE								PESTICIDE**
SMO TRAPPING NO.	TOLUENE-D8 (81-117)	BFB (74-121)	1,2 DICHLOROETHANE-D4 (70-121)	NITROBENZENE-D5 (23-120)	2-FLUOROBIPHENYL (30-115)	TERPHENYL-D14 (18-137)			PHENOL-D6 (24-113)	2-FLUOROPHENOL (25-121)	2,4,6 TRIBROMOPHENOL (19-122)	DIBUTYLCHLORENDATE (20-150)
RB13760662	102	101	90									
RBBA6113	103	107	97									
CC999MS	97	104	106									
CC999MSD	96	102	106									
CC433	105	103	96									
CC999	104	106	99									
CFA30	112	92	104									
CFA13(1/2)	110	102	104									
RBBB8117	105	108	97									
RBBA6113	103	107	97									

NOT REQUIRED

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

** ADVISORY LIMITS ONLY

Volatiles: 0 out of 30 ; outside of QC limits

Semi-Volatiles: NR out of NR ; outside of QC limits

Pesticides: NR out of NR ; outside of QC limits

7/85

Comments: NR = NOT REQUIRED

100007

AR100327

AR100327

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. 6479 - B#11 **Contractor** Versar Inc. **Contract No.** 68-01-7082

Low Level _____ **Medium Level** ✓

100010

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS * RPD	QC LIMITS * RECOVERY
VOA SMO SAMPLE NO. CC991	1,1-Dicholorethene	50	0	56	112	58	116	4	22	59-172
	Trichloroethene	50	0	52	104	52	104	0	24	62-137
	Chlorobenzene	50	0	49	98	48	96	2	21	60-133
	Toluene	50	4	52	96	50	92	4	21	59-139
	Benzene	50	0	51	102	51	102	0	21	66-142
B/N SMO SAMPLE NO. NR	1,2,4-Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Pyrene								36	35-142
	N-Nitrosodi-n-Propylamine								38	41-126
	1,4-Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO. NR	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2-Chlorophenol								50	25-102
	4-Chloro-3-Methylphenol								33	26-103
	4-Nitrophenol								50	11-114
PEST SMO SAMPLE NO. NR	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
	4,4'-DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N NR out of NR ; outside QC limits
ACID NR out of NR ; outside QC limits
PEST NR out of NR ; outside QC limits

RECOVERY: VOAs 0 out of 10 ; outside QC limits
B/N NR out of NR ; outside QC limits
ACID NR out of NR ; outside QC limits
PEST NR out of NR ; outside QC limits

Comments: NR = NOT REQUIRED

(1)

AR100328

AR100328

100009

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. 6479-B#11 Contractor Versar Inc. Contract No. 68-01-7082

Low Level ✓ Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS * RPD	QC LIMITS * RECOVERY
VOA SMO SAMPLE NO. LC999	1,1-Dicholorethene	50	ϕ	65	130	63	126	3	22	59-172
	Trichloroethene	50	ϕ	54	108	54	108	0	24	62-137
	Chlorobenzene	50	ϕ	51	102	50	100	2	21	60-133
	Toluene	50	13	56	86	54	82	5	21	59-139
	Benzene	50	ϕ	55	110	54	108	2	21	66-142
B/N SMO SAMPLE NO. NR	1,2,4-Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Pyrene								36	35-142
	N-Nitrosodi-n-Propylamine								38	41-126
	1,4-Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO. NR	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2-Chlorophenol								50	25-102
	4-Chloro-3-Methylphenol								33	26-103
	4-Nitrophenol								50	11-114
PEST SMO SAMPLE NO. NR	Lindane								60	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
	4,4'-DDT								50	23-134

(✓)

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N NR out of NR ; outside QC limits
ACID NR out of NR ; outside QC limits
PEST NR out of NR ; outside QC limits

RECOVERY: VOAs 0 out of 10 ; outside QC limits
B/N NR out of NR ; outside QC limits
ACID NR out of NR ; outside QC limits
PEST NR out of NR ; outside QC limits

Comments: NR = NOT REQUIRED

00039

Duplicate/Triplicate Analysis of Non-Matrix Spiked (Indigenous) Compounds

Outliers are tabulated below for three types of multiple analyses:

(1) Field duplicates

(2) Un-spiked laboratory duplicates

(3) Matrix spike duplicate plus corresponding unspiked sample evaluated for non-matrix spiked (indigenous) compounds. (Spike recoveries are evaluated on a separate form.)

Analytical Fraction	Outlier Criteria (for tabulation purposes only)			
	Relative standard deviation		Equivalent Relative Percent Difference	
	solid	aqueous	solid	aqueous
VOA				
BNA				
PEST				

	CONCENTRATIONS						relative standard deviation or relative percent difference	concentration units	footnotes
	Analysis No. 1		Analysis No. 2		Analysis No. 3				
COMPOUND	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.			
TOTAL XYLENES	[illegible]	14,000	[illegible]	31,000	[illegible]	22,000	26 %		
TOTAL XYLENES	[illegible]	55	[illegible]	29	[illegible]	25	45 %	RSD	
							63 %	RPD	

COMMENTS:

AR100330

6850 Versar Center, Springfield VA 22151 (703) 750-3000

Sample Number
CC999

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
Lab Sample ID No: 15405
Sample Matrix: SOIL
Data Release Authorized By:

Case No: 6479 B#11
QC Report No: 6479 B#11
Contract No: 68-01-7082
Date Sample Received: 10/10/86

VOLATILE COMPOUNDS

Concentration: LOW
Date Extracted/Prepared: 10/20/86
Date Analyzed: 10/20/86
Conc/Dil Factor: 1 pH
Percent Moisture: 10.32

CAS Number		ug/Kg	CAS Number		ug/Kg
74-87-3	Chloromethane	11 u	78-87-5	1,2-Dichloropropane	6 u
74-83-9	Bromomethane	11 u	10061-02-6	Trans-1,3-Dichloropropene	6 u
75-01-4	Vinyl Chloride	11 u	79-01-6	Trichloroethene	6 u
75-00-3	Chloroethane	11 u	124-48-1	Dibromochloromethane	6 u
75-09-2	Methylene Chloride	1 J	79-00-5	1,1,2-Trichloroethane	6 u
67-64-1	Acetone	21 B	71-43-2	Benzene	6 u
75-15-0	Carbon Disulfide	6 u	10061-01-5	cis-1,3-Dichloropropene	6 u
75-35-4	1,1-Dichloroethene	6 u	110-75-8	2-chloroethylvinylether	11 u
75-34-3	1,1-Dichloroethane	6 u	75-25-2	Bromoform	6 u
156-60-5	Trans-1,2-Dichloroethene	6 u	108-10-1	4-Methyl-2-Pentanone	11 u
67-66-3	Chloroform	6 u	591-78-6	2-Hexanone	11 u
107-06-2	1,2-Dichloroethane	6 u	127-18-4	Tetrachloroethene	6 u
78-93-3	2-butanone	11 u	79-34-5	1,1,2,2-Tetrachloroethane	6 u
71-55-6	1,1,1-Trichloroethane	6 u	108-88-3	Toluene	14
56-23-5	Carbon Tetrachloride	6 u	108-90-7	Chlorobenzene	6 u
108-05-4	Vinyl Acetate	11 u	100-41-4	Ethylbenzene	4 J
75-27-4	Bromodichloromethane	6 u	100-42-5	Styrene	6 u
				Total Xylenes	55

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.

B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

VOAFi: REV062486

AR100331

Form I

(10)

6850 Versar Center, Springfield VA 22151 (703) 750-3000

Sample Number
CC999MS

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
Lab Sample ID No: 15405MS
Sample Matrix: SOIL
Data Release Authorized By:

Case No: 6479 B#11
QC Report No: 6479 B#11
Contract No: 68-01-7082
Date Sample Received: 10/10/86

VOLATILE COMPOUNDS

Concentration: LOW
Date Extracted/Prepared: 10/21/86
Date Analyzed: 10/21/86
Conc/Dil Factor: 1 pH
Percent Moisture: 10.32

CAS Number		ug/Kg
74-87-3	Chloromethane	11 u
74-83-9	Bromomethane	11 u
75-01-4	Vinyl Chloride	11 u
75-00-3	Chloroethane	11 u
75-09-2	Methylene Chloride	4 J
67-64-1	Acetone	33 B
75-15-0	Carbon Disulfide	6 u
75-35-4	1,1-Dichloroethene	6 u
75-34-3	1,1-Dichloroethane	6 u
156-60-5	Trans-1,2-Dichloroethene	6 u
67-66-3	Chloroform	6 u
107-06-2	1,2-Dichloroethane	6 u
78-93-3	2-butanone	11 u
71-55-6	1,1,1-Trichloroethane	6 u
56-23-5	Carbon Tetrachloride	6 u
108-05-4	Vinyl Acetate	11 u
75-27-4	Bromodichloromethane	6 u

CAS Number		ug/Kg
78-87-5	1,2-Dichloropropane	6 u
10061-02-6	Trans-1,3-Dichloropropene	6 u
79-01-6	Trichloroethene	6 u
124-48-1	Dibromochloromethane	6 u
79-00-5	1,1,2-Trichloroethane	6 u
71-43-2	Benzene	6 u
10061-01-5	cis-1,3-Dichloropropene	6 u
110-75-8	2-chloroethylvinylether	11 u
75-25-2	Bromoform	6 u
108-10-1	4-Methyl-2-Pentanone	11 u
591-78-6	2-Hexanone	11 u
127-18-4	Tetrachloroethene	6 u
79-34-5	1,1,2,2-Tetrachloroethane	6 u
108-88-3	Toluene	NA
108-90-7	Chlorobenzene	6 u
100-41-4	Ethylbenzene	2 J
100-42-5	Styrene	6 u
	Total Xylenes	29

OK 11/7/86

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.

B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

NA COMPOUND PRESENT IN BOTH MATRIX SPIKE STANDARD AND UNSPIKED SAMPLE

ARI00332

VOAF1: REV062486

Form I

6850 Versar Center, Springfield VA 22151 (703) 750-3000

Sample Number
CC999MSD

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
Case No: 6479 B#11
Lab Sample ID No: 15405
QC Report No: 6479 B#11
Sample Matrix: SOIL
Contract No: 68-01-7082
Data Release Authorized By:
Date Sample Received: 10/10/86

VOLATILE COMPOUNDS

Concentration: LOW
Date Extracted/Prepared: 10/21/86
Date Analyzed: 10/21/86
Conc/Dil Factor: 1 pH
Percent Moisture: 10.32

CAS Number		ug/Kg	CAS Number		ug/Kg
74-87-3	Chloromethane	11 u	78-87-5	1,2-Dichloropropane	6 u
74-83-9	Bromomethane	11 u	10061-02-6	Trans-1,3-Dichloropropene	6 u
75-01-4	Vinyl Chloride	11 u	79-01-6	Trichloroethene	6 u
75-00-3	Chloroethane	11 u	124-48-1	Dibromochloromethane	6 u
75-09-2	Methylene Chloride	3 J	79-00-5	1,1,2-Trichloroethane	6 u
67-64-1	Acetone	33 B	71-43-2	Benzene	6 u
75-15-0	Carbon Disulfide	6 u	10061-01-5	cis-1,3-Dichloropropene	6 u
75-35-4	1,1-Dichloroethene	6 u	110-75-8	2-chloroethylvinylether	11 u
75-34-3	1,1-Dichloroethane	6 u	75-25-2	Bromoform	6 u
156-60-5	Trans-1,2-Dichloroethene	6 u	108-10-1	4-Methyl-2-Pentanone	11 u
67-66-3	Chloroform	6 u	591-78-6	2-Hexanone	11 u
107-06-2	1,2-Dichloroethane	6 u	127-18-4	Tetrachloroethene	6 u
78-93-3	2-butanone	11 u	79-34-5	1,1,2,2-Tetrachloroethane	6 u
71-55-6	1,1,1-Trichloroethane	6 u	108-88-3	Toluene	NA
56-23-5	Carbon Tetrachloride	6 u	108-90-7	Chlorobenzene	6 u
108-05-4	Vinyl Acetate	11 u	100-41-4	Ethylbenzene	2 J
75-27-4	Bromodichloromethane	6 u	100-42-5	Styrene	6 u
				Total Xylenes	25

CAS 11/7/86

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.

B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

NA COMPOUND IS PRESENT IN BOTH MATRIX SPIKE SAMPLE AND UNSPIKED SAMPLE

AR100333

VOAF1: REV062486

Form I

AR100333

INITIAL CALIBRATION DATA - VOLATILE HSL COMPOUNDS

CASE NO. 6479 CONTRACT LAB: VERSAR
CONTRACT NO. 68-01-7082 INSTRUMENT IDENTIFIER: BA
CALIBRATION DATE: 10/08/86
MINIMUM MEAN RF FOR SPCC IS 0.30 SPCC **
MAXIMUM %RSD FOR CCC IS 30% CCC *

COMPOUND	BA5976 RF 20NG	BA5975 RF 50NG	BA5974 RF 100NG	BA5973 RF 150NG	BA5972 RF 200NG	MEAN RF	%RSD
CHLOROMETHANE	0.893	0.826	0.820	0.912	0.989	0.888**	6.9
BROMOMETHANE	1.971	1.953	1.575	1.574	1.518	1.718	11.6
VINYL CHLORIDE	1.658	1.570	1.728	1.977	1.951	1.777	9.0*
CHLOROETHANE	0.920	0.851	0.875	0.962	1.046	0.931	7.3
METHYLENE CHLORIDE	1.144	1.078	1.083	1.159	1.169	1.127	3.4
ACETONE	0.461	0.467	0.495	0.422	0.413	0.451	6.6
CARBON DISULFIDE	2.120	2.172	2.191	2.641	2.776	2.380	11.4
1,1,-DICHLOROETHENE	1.038	0.975	1.006	1.196	1.200	1.083	8.8*
1,1-DICHLOROETHANE	1.785	1.786	1.850	2.050	2.151	1.924**	7.7
TRANS-1,2-DICHLOROETHENE	1.055	1.024	1.044	1.166	1.182	1.094	6.0
CHLOROFORM	2.142	2.131	2.170	2.362	2.426	2.246	5.4*
1,2-DICHLOROETHANE	1.686	1.688	1.680	1.758	1.838	1.730	3.5
2-BUTANONE	0.040	0.038	0.048	0.040	0.040	0.041	8.7
1,1,1-TRICHLOROETHANE	0.356	0.351	0.371	0.421	0.446	0.389	9.7
CARBON TETRACHLORIDE	0.331	0.343	0.365	0.432	0.441	0.382	11.8
VINYL ACETATE	0.412	0.390	0.362	0.369	0.363	0.379	5.1
BROMODICHLOROMETHANE	0.421	0.443	0.470	0.498	0.513	0.469	7.2
1,2-DICHLOROPROPANE	0.300	0.317	0.336	0.357	0.367	0.335	7.3*
TRANS-1,3-DICHLOROPROPENE	0.387	0.402	0.412	0.437	0.448	0.417	5.3
TRICHLOROETHENE	0.394	0.409	0.428	0.439	0.422	0.418	3.7
DIBROMOCHLOROMETHANE	0.399	0.458	0.456	0.467	0.488	0.454	6.5
1,1,2,-TRICHLOROETHANE	0.327	0.340	0.350	0.379	0.407	0.361	8.0
BENZENE	0.689	0.724	0.738	0.798	0.830	0.756	6.7
CIS-1,3-DICHLOROPROPENE	0.272	0.286	0.292	0.333	0.367	0.310	11.2
2-CHLOROETHYLVINYLETHER	0.013	0.013	0.012	0.005	0.013	0.011	28.7
BROMOFORM	0.340	0.376	0.415	0.435	0.427	0.399**	8.9
2-HEXANONE	0.393	0.362	0.423	0.330	0.336	0.369	9.4
4-METHYL-2-PENTANONE	0.412	0.401	0.478	0.371	0.383	0.409	9.0
TETRACHLOROETHENE	0.503	0.504	0.468	0.475	0.462	0.482	3.6
1,1,2,2-TETRACHLOROETHANE	0.755	0.736	0.807	0.883	0.954	0.827**	9.8
TOLUENE	0.689	0.653	0.640	0.660	0.678	0.664	2.6*
CHLOROBENZENE	1.024	0.994	0.961	0.981	0.962	0.984**	2.3
ETHYLBENZENE	0.491	0.467	0.465	0.504	0.508	0.487	3.6*
STYRENE	0.889	0.852	0.814	0.864	0.944	0.872	4.9
TOTAL XYLENES	0.578	0.554	0.535	0.577	0.637	0.576	5.9

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO. 6479 B#11 CONTRACT LAB: VERSAR

CONTRACT NO. 68-01-7082 INSTRUMENT IDENTIFIER: BA

CALIBRATION DATE: 10/08/86

STANDARD FILE: BA6059

DATE: 10/16/86 TIME: 8:57

MAXIMUM % D FOR CCC IS 25

* CCC

** SPCC

COMPOUND	MEAN RF(I)	RF(D)	% D
CHLOROMETHANE	0.888	** 0.661	-25.521
BROMOMETHANE	1.718	3.112	81.101
VINYL CHLORIDE	1.777	2.030	* 14.259
CHLOROETHANE	0.931	1.311	40.824
METHYLENE CHLORIDE	1.127	1.073	-4.770
ACETONE	0.451	0.432	-4.313
CARBON DISULFIDE	2.380	2.057	-13.563
1,1,-DICHLOROETHENE	1.083	1.010	* -6.732
1,1-DICHLOROETHANE	1.924	** 2.167	12.628
TRANS-1,2-DICHLOROETHENE	1.094	1.123	2.604
CHLOROFORM	2.246	2.523	* 12.306
1,2-DICHLOROETHANE	1.730	2.216	28.064
2-BUTANONE	0.041	0.031	-25.637
1,1,1-TRICHLOROETHANE	0.389	0.360	-7.520
CARBON TETRACHLORIDE	0.382	0.340	-11.108
VINYL ACETATE	0.379	0.318	-16.012
BROMODICHLOROMETHANE	0.469	0.412	-12.227
1,2-DICHLOROPROPANE	0.335	0.305	* -9.205
TRANS-1,3-DICHLOROPROPENE	0.417	0.435	4.292
TRICHLOROETHENE	0.418	0.382	-8.724
DIBROMOCHLOROMETHANE	0.454	0.379	-16.549
1,1,2,-TRICHLOROETHANE	0.361	0.328	-9.017
BENZENE	0.756	0.762	0.838
CIS-1,3-DICHLOROPROPENE	0.310	0.273	-11.834
2-CHLOROETHYLVINYLETHER	0.011	0.015	32.005
BROMOFORM	0.399	** 0.318	-20.272
2-HEXANONE	0.369	0.276	-25.017
4-METHYL-2-PENTANONE	0.409	0.312	-23.803
TETRACHLOROETHENE	0.482	0.460	-4.708
1,1,2,2-TETRACHLOROETHANE	0.827	** 0.711	-13.956
TOLUENE	0.664	0.647	* -2.603
CHLOROBENZENE	0.984	** 0.958	-2.664
ETHYLBENZENE	0.487	0.478	* -1.759
STYRENE	0.872	0.979	12.231
TOTAL XYLENES	0.576	0.658	14.088

AR100335

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO. 6479 B#11 CONTRACT LAB: VERSAR

CONTRACT NO. 68-01-7082 INSTRUMENT IDENTIFIER: BA

CALIBRATION DATE: 10/08/86

STANDARD FILE: BA6069

DATE: 10/16/86 TIME: 20:20

MAXIMUM % D FOR CCC IS 25

SPCC **
CCC *

COMPOUND	MEAN RF(I)	RF(O)	% D
CHLOROMETHANE	0.888	0.699**	-21.273
BROMOMETHANE	1.718	2.333	35.757
VINYL CHLORIDE	1.777	1.717	-3.377*
CHLOROETHANE	0.931	1.205	29.398
METHYLENE CHLORIDE	1.127	1.148	1.923
ACETONE	0.451	0.392	-13.170
CARBON DISULFIDE	2.380	1.748	-26.537
1,1,-DICHLOROETHENE	1.083	0.968	-10.648*
1,1-DICHLOROETHANE	1.924	2.049**	6.497
TRANS-1,2-DICHLOROETHENE	1.094	1.079	-1.417
CHLOROFORM	2.246	2.385	6.182
1,2-DICHLOROETHANE	1.730	2.099	21.319
2-BUTANONE	0.041	0.035	-15.504
1,1,1-TRICHLOROETHANE	0.389	0.328	-15.603
CARBON TETRACHLORIDE	0.382	0.314	-17.819
VINYL ACETATE	0.379	0.309	-18.366
BROMODICHLOROMETHANE	0.469	0.404	-13.926
1,2-DICHLOROPROPANE	0.335	0.306	-8.617*
TRANS-1,3-DICHLOROPROPENE	0.417	0.452	8.328
TRICHLOROETHENE	0.418	0.400	-4.362
DIBROMOCHLOROMETHANE	0.454	0.391	-13.914
1,1,2,-TRICHLOROETHANE	0.361	0.354	-1.922
BENZENE	0.756	0.739	-2.241
CIS-1,3-DICHLOROPROPENE	0.310	0.281	-9.373
2-CHLOROETHYLVINYLETHER	0.011	0.015	30.740
BROMOFORM	0.399	0.332**	-16.751
2-HEXANONE	0.369	0.272	-26.250
4-METHYL-2-PENTANONE	0.409	0.310	-24.137
TETRACHLOROETHENE	0.482	0.442	-8.429
1,1,2,2-TETRACHLOROETHANE	0.827	0.739**	-10.639
TOLUENE	0.664	0.608	-8.477*
CHLOROBENZENE	0.984	0.943**	-4.216
ETHYLBENZENE	0.487	0.437	-10.284*
STYRENE	0.872	0.823	-5.700
TOTAL XYLENES	0.576	0.547	-5.038

AR100336

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO. 6479 B#11 CONTRACT LAB: VERSAR

CONTRACT NO. 68-01-7082 INSTRUMENT IDENTIFIER: BA

CALIBRATION DATE: 10/08/86

STANDARD FILE: BA6077

DATE: 10/17/86 TIME: 8:33

MAXIMUM % D FOR CCC IS 25

* CCC

** SPCC

COMPOUND	MEAN RF(I)	RF(O)	% D
CHLOROMETHANE	0.888	**0.543	-38.860
BROMOMETHANE	1.718	2.563	49.150
VINYL CHLORIDE	1.777	1.657	*-6.766
CHLOROETHANE	0.931	0.993	6.622
METHYLENE CHLORIDE	1.127	1.057	-6.169
ACETONE	0.451	0.428	-5.125
CARBON DISULFIDE	2.380	1.827	-23.241
1,1,-DICHLOROETHENE	1.083	0.963	*-11.077
1,1-DICHLOROETHANE	1.924	**2.040	6.033
TRANS-1,2-DICHLOROETHENE	1.094	1.120	2.327
CHLOROFORM	2.246	2.391	* 6.426
1,2-DICHLOROETHANE	1.730	2.090	20.816
2-BUTANONE	0.041	0.029	-29.814
1,1,1-TRICHLOROETHANE	0.389	0.339	-12.680
CARBON TETRACHLORIDE	0.382	0.305	-20.313
VINYL ACETATE	0.379	0.316	-16.618
BROMODICHLOROMETHANE	0.469	0.397	-15.350
1,2-DICHLOROPROPANE	0.335	0.303	* -9.698
TRANS-1,3-DICHLOROPROPENE	0.417	0.431	3.413
TRICHLOROETHENE	0.418	0.371	-11.412
DIBROMOCHLOROMETHANE	0.454	0.358	-20.989
1,1,2,-TRICHLOROETHANE	0.361	0.332	-7.948
BENZENE	0.756	0.741	-2.024
CIS-1,3-DICHLOROPROPENE	0.310	0.263	-15.268
2-CHLOROETHYLVINYLETHER	0.011	0.016	38.016
BROMOFORM	0.399	**0.300	-24.621
2-HEXANONE	0.369	0.271	-26.384
4-METHYL-2-PENTANONE	0.409	0.317	-22.494
TETRACHLOROETHENE	0.482	0.466	-3.416
1,1,2,2-TETRACHLOROETHANE	0.827	**0.746	-9.745
TOLUENE	0.664	0.652	*-1.800
CHLOROBENZENE	0.984	**0.981	-0.374
ETHYLBENZENE	0.487	0.471	*-3.235
STYRENE	0.872	0.905	3.680
TOTAL XYLENES	0.576	0.596	3.411

AR100337

(16)

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO. 6479 BA11 CONTRACT LAB: VERSAR

CONTRACT NO. 68-01-7082 INSTRUMENT IDENTIFIER: BA

CALIBRATION DATE: 10/08/86 SPCC **

STANDARD FILE: BA6088 CCC +

DATE: 10/17/86 TIME: 21:06

MAXIMUM % D FOR CCC IS 25

COMPOUND	MEAN RF(I)	RF(O)	% D
CHLOROMETHANE	0.888	0.662**	-25.394
BROMOMETHANE	1.718	2.801	63.017
VINYL CHLORIDE	1.777	1.810	1.849*
CHLOROETHANE	0.931	1.175	26.181
METHYLENE CHLORIDE	1.127	1.071	-4.947
ACETONE	0.451	0.340	-24.567
CARBON DISULFIDE	2.380	1.770	-25.623
1,1,-DICHLOROETHENE	1.083	0.911	-15.908*
1,1-DICHLOROETHANE	1.924	2.062**	7.159
TRANS-1,2-DICHLOROETHENE	1.094	1.067	-2.461
CHLOROFORM	2.246	2.400	6.838*
1,2-DICHLOROETHANE	1.730	2.184	26.211
2-BUTANONE	0.041	0.027	-34.734
1,1,1-TRICHLOROETHANE	0.389	0.356	-8.534
CARBON TETRACHLORIDE	0.382	0.331	-13.282
VINYL ACETATE	0.379	0.329	-13.306
BROMODICHLOROMETHANE	0.469	0.426	-9.138
1,2-DICHLOROPROPANE	0.335	0.319	-4.856*
TRANS-1,3-DICHLOROPROPENE	0.417	0.464	11.261
TRICHLOROETHENE	0.418	0.378	-9.647
DIBROMOCHLOROMETHANE	0.454	0.399	-11.986
1,1,2,-TRICHLOROETHANE	0.361	0.343	-4.977
BENZENE	0.756	0.746	-1.316
CIS-1,3-DICHLOROPROPENE	0.310	0.287	-7.534
2-CHLOROETHYLVINYLETHER	0.011	0.016	44.332
BROMOFORM	0.399	0.333**	-16.422
2-HEXANONE	0.369	0.235	-36.159
4-METHYL-2-PENTANONE	0.409	0.283	-30.807
TETRACHLOROETHENE	0.482	0.469	-2.681
1,1,2,2-TETRACHLOROETHANE	0.827	0.739**	-10.570
TOLUENE	0.664	0.645	-2.814*
CHLOROBENZENE	0.984	0.995**	1.098
ETHYLBENZENE	0.487	0.461	-5.249*
STYRENE	0.872	0.899	3.079
TOTAL XYLENES	0.576	0.592	2.710

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO. 6479 B#11 CONTRACT LAB: VERSAR

CONTRACT NO. 68-01-7082 INSTRUMENT IDENTIFIER: BA

CALIBRATION DATE: 10/08/86

STANDARD FILE: BA6096

DATE: 10/19/86 TIME: 17:03

MAXIMUM % D FOR CCC IS 25

SPCC **
CCC *

COMPOUND	MEAN RF(I)	RF(O)	% D
CHLOROMETHANE	0.888	0.496**	-44.149
BROMOMETHANE	1.718	2.355	37.059
VINYL CHLORIDE	1.777	1.624	-8.625*
CHLOROETHANE	0.931	1.177	26.366
METHYLENE CHLORIDE	1.127	1.076	-4.514
ACETONE	0.451	0.429	-4.869
CARBON DISULFIDE	2.380	1.804	-24.213
1,1,-DICHLOROETHENE	1.083	0.896	-17.287*
1,1-DICHLOROETHANE	1.924	1.922**	-0.106
TRANS-1,2-DICHLOROETHENE	1.094	1.039	-5.016
CHLOROFORM	2.246	2.322	3.383*
1,2-DICHLOROETHANE	1.730	1.975	14.168
2-BUTANONE	0.041	0.033	-20.324
1,1,1-TRICHLOROETHANE	0.389	0.338	-13.022
CARBON TETRACHLORIDE	0.382	0.316	-17.383
VINYL ACETATE	0.379	0.307	-18.916
BROMODICHLOROMETHANE	0.469	0.422	-10.131
1,2-DICHLOROPROPANE	0.335	0.300	-10.484*
TRANS-1,3-DICHLOROPROPENE	0.417	0.444	6.397
TRICHLOROETHENE	0.418	0.378	-9.635
DIBROMOCHLOROMETHANE	0.454	0.385	-15.183
1,1,2,-TRICHLOROETHANE	0.361	0.344	-4.491
BENZENE	0.756	0.728	-3.698
CIS-1,3-DICHLOROPROPENE	0.310	0.271	-12.611
2-CHLOROETHYLVINYLETHER	0.011	0.013	16.476
BROMOFORM	0.399	0.322**	-19.345
2-HEXANONE	0.369	0.282	-23.476
4-METHYL-2-PENTANONE	0.409	0.334	-18.321
TETRACHLOROETHENE	0.482	0.452	-6.304
1,1,2,2-TETRACHLOROETHANE	0.827	0.770**	-6.846
TOLUENE	0.664	0.622	-6.329*
CHLOROBENZENE	0.984	0.978**	-0.637
ETHYLBENZENE	0.487	0.457	-6.218*
STYRENE	0.872	0.867	-0.639
TOTAL XYLENES	0.576	0.560	-2.762

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO. 6479 B11 CONTRACT LAB: VERSAR

CONTRACT NO. 68-01-7082 INSTRUMENT IDENTIFIER: BA

CALIBRATION DATE: 10/08/86 SPCC **

STANDARD FILE: BA6111 CCC *

DATE: 10/20/86 TIME: 16:22

MAXIMUM % D FOR CCC IS 25

COMPOUND	MEAN RF(I)	RF(C)	% D
CHLOROMETHANE	0.888	0.517**	-41.800
BROMOMETHANE	1.718	2.673	55.529
VINYL CHLORIDE	1.777	1.507	-15.204*
CHLOROETHANE	0.931	1.030	10.638
METHYLENE CHLORIDE	1.127	1.022	-9.289
ACETONE	0.451	0.500	10.846
CARBON DISULFIDE	2.380	1.960	-17.659
1,1,-DICHLOROETHENE	1.083	0.861	-20.478*
1,1-DICHLOROETHANE	1.924	2.180**	13.295
TRANS-1,2-DICHLOROETHENE	1.094	1.037	-5.208
CHLOROFORM	2.246	2.489	10.819 *
1,2-DICHLOROETHANE	1.730	2.303	33.135
2-BUTANONE	0.041	0.029	-28.623
1,1,1-TRICHLOROETHANE	0.389	0.341	-12.213
CARBON TETRACHLORIDE	0.382	0.330	-13.752
VINYL ACETATE	0.379	0.314	-17.051
BROMODICHLOROMETHANE	0.469	0.443	-5.495
1,2-DICHLOROPROPANE	0.335	0.321	-4.299 *
TRANS-1,3-DICHLOROPROPENE	0.417	0.462	10.874
TRICHLOROETHENE	0.418	0.382	-8.572
DIBROMOCHLOROMETHANE	0.454	0.422	-7.094
1,1,2,-TRICHLOROETHANE	0.361	0.336	-6.863
BENZENE	0.756	0.736	-2.603
CIS-1,3-DICHLOROPROPENE	0.310	0.276	-10.974
2-CHLOROETHYLVINYLETHER	0.011	0.018	55.877
BROMOFORM	0.399	0.364**	-8.689
2-HEXANONE	0.369	0.305	-17.337
4-METHYL-2-PENTANONE	0.409	0.359	-12.269
TETRACHLOROETHENE	0.482	0.490	1.493
1,1,2,2-TETRACHLOROETHANE	0.827	0.764**	-7.590
TOLUENE	0.664	0.643	-3.097*
CHLOROBENZENE	0.984	0.990**	0.527
ETHYLBENZENE	0.487	0.462	-5.024*
STYRENE	0.872	0.912	4.513
TOTAL XYLENES	0.576	0.618	7.235

AR100340

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Case No. 6479-B*11 Contractor Versar Inc. Contract No. 68-01-7082

Instrument ID BA Date 10-20-86 Time 1557

Lab ID BA6110 Data Release Authorized By:

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE	
50	15.0 - 40.0% of the base peak	25.68	
75	30.0 - 60.0% of the base peak	49.55	
95	Base peak, 100% relative abundance	100.00	
96	5.0 - 9.0% of the base peak	8.54	
173	Less than 1.0% of the base peak	0.0	
174	Greater than 50.0% of the base peak	91.99	
175	5.0 - 9.0% of mass 174	8.09	(8.80) [1]
176	Greater than 95.0%, but less than 101.0% of mass 174	91.47	(99.44) [1]
177	5.0 - 9.0% of mass 176	7.80	(8.53) [2]

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

[1] Value in parenthesis is % mass 174.
[2] Value in parenthesis is % mass 176.

SAMPLE ID	LAB ID		DATE OF ANALYSIS	TIME OF ANALYSIS
STD#6863	BA6111	VOA 5-PPB Low Soil STD	10-20-86	1622
RB	BA6112	VOA Med. Soil Reagent Blank	10-20-86	1724
RB	BA6113	VOA Low Soil Reagent Blank	10-20-86	1804
CC999	BA6114	VOA Low Soil #15405A	10-20-86	1919
CF430	BA6115	VOA Low Soil #15406A	10-20-86	1959
CF413	BA6116	VOA Low Soil #15409A	10-20-86	2038
CF412	BA6117	VOA MED. Soil #15408A (1/100)	10-20-86	2120
CF414	BA6118	VOA MED Soil #15410A (1/100)	10-20-86	2200
CF413	BA6119	VOA Low Soil #15409A (1/2)	10-20-86	2240
CF430 Dup	BA6119 6120	VOA Low Soil #15406A	10-20-86	2320
CF413	BA6121	VOA Low Soil #15409A (1/10)	10-20-86	2359
CC999MS	BA6122	VOA Low Soil #15405A	10-21-86	0041
CC999MSD	BA6123	VOA Low Soil #15405A	10-21-86	0122

AR100341

FORM V

7/85

6.0 LABORATORY DATA

6.1 Sample Data Summary

The attached data summary contains only compounds which were identified as detected in at least one sample. The complete list of compounds analyzed for, their results, and the associated detection limits are located as an appendix. The following codes are used in the data summary to indicate the confidence in these positive results:

	This concentration reported by laboratory, but evidence to doubt presence of compound/element (may or may not be present).
J	Approximate value; detected below limit of accurate quantitation.
UF	The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit.
F	The associated numerical value is an estimated quantity because quality control criteria were not met. (See Quality Assurance Review for specifics as to magnitude or direction of variability or bias.)
R	Quality Control indicates that data are unusable (compounds may or may not be present). Resampling and/or reanalysis is necessary for verification.
N	Evidence for presence of material is presumptive (tentative identification).
H	Suspected Unreliable Results: Even though data validation criteria have been met, this result may still be suspect because false positives are a frequent problem with this particular compound or method of analysis. To prove validity, corroboration with additional analytical results or supporting information would be recommended.

TDD Number F3-8609-04 (SAMPLING)
EPA Number _____

SAMPLE DATA SUMMARY
TARGET COMPOUNDS

☒ Organic ☐ Inorganic

Site Name H+H INC
Date of Sample 10/9/86

Sample Number	Sample Description and Location	Phase	Units	Compounds Detected: Aroclor 1248	Aroclor 1254	Aroclor 1260												Remarks
1	P-1	SOL	mg/kg	48	26	13												
2	P-2	SOL	mg/kg	36		81												
3	P-3	SOL	mg/kg															
4	P-4	SOL	mg/kg															
5	P-5	SOL	mg/kg			1.3												
6	P-6	SOL	mg/kg			55												
7	R.O.	SOL	mg/kg			0.8												
8	S-1	SOL	mg/kg			0.4												
9	S-2	SOL	mg/kg			10 J												
10	S-3	SOL	mg/kg	1.6		4.5												
11	S-4 DUP	SOL	mg/kg	0.57	0.38	0.3												
12	BP1A	SOL	mg/kg	15	5.2	0.9												
13	BP1B	SOL	mg/kg	140	39	4.9												
14	BP1C	SOL	mg/kg	22	6.6	1.1												

NOTE: For a review of this data and non-target, tentatively identified compounds, please see the Analytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

TDD Number F3-8609-04 (SAMPLING)

EPA Number _____

SAMPLE DATA SUMMARY
TARGET COMPOUNDS

☒ Organic ☐ Inorganic

Site Name H+H INC.

Date of Sample 10/9/86

Sample Number	Sample Description and Location	Phase	Units	Compounds Detected: AROCLOR 1248	AROCLOR 1254	AROCLOR 1260											Remarks
15	BP2A	SOL	mg/kg	43	19	3.9											
16	BP2A	SOL	mg/kg	41	19	7.6											DUPLICATE OF #15
17	BP2B	SOL	mg/kg	64	26	3.4											
18	BP2C	SOL	mg/kg	18		0.6											
19	R1A	SOL	mg/kg	20	7.1	3.6											
20	R1B	SOL	mg/kg	3.5	2.3	1.3											
21	R2A	SOL	mg/kg	22	7.5	2.6											
22	R2B	SOL	mg/kg	2.5	1.7	1.2											
23	BACKGROUND	SOL	mg/kg														
6	P-6	SOL	mg/kg			78											LAB DUPLICATE
9	S-2	SOL	mg/kg			69J											LAB DUPLICATE

NOTE: For a revi[illegible] this data and non-target, tentatively identified compounds, please see th[illegible]tical Quality Assurance section of this report.

◇ Denotes r[illegible] of questionable qualitative significance based upon quality assurance revie[illegible] data.

6.2 Quality Assurance Review

6.2.1 Organic Data: Lab Case 6573

6.2.1.1 Summary

Twenty-three solid samples were analyzed through the EPA Contract Laboratory Program (CLP) Special Analytical Services for polychlorinated biphenyls (PCBs) only. Due to high concentrations of PCBs, some samples required dilutions of up to 20:1. No field blank was provided; however, a background sample was included that, for all practical purposes, serves as a blank. A field duplicate was also included. In addition, the laboratory analyzed two samples as unspiked duplicates; these have been included on the data summary.

The laboratory data have been fully reviewed to determine the usability of the results. (Areas examined in detail are listed in the Support Documentation appendix.) In general, analyses were performed acceptably with only a few problems requiring modification of the reported results.

PCBs were detected in all but three of the samples analyzed. These PCBs were confined exclusively to Aroclors 1248, 1254, and 1260. Since these three Aroclors share many of the same components, it is difficult to determine the relative amounts ofeach one present. However, measures have been taken to insure that the cumulative concentrations of these Aroclors are accurate. Results obtained in duplicate analyses were variable; in some instances, correlation was quite good and in others it was poor. Consequently, only sample-specific results have been qualified. It should be noted that solid samples such as these are inherently inhomogenous and results should be treated accordingly.

6.2.1.2 Qualifiers

It is recommended that this data package be utilized only with the following qualifier statements.

- Due to poor correlation between duplicate analyses of sample 9, the reported concentration of Aroclor 1260 should be considered estimated (see the sample data summary for results).

- All samples were analyzed approximately two months following sampling. However, PCBs are extremely stable compounds and solid samples are unaffected by the duration of the holding times. In the case of the one aqueous sample (background), detection limits may be slightly higher than reported as a result of the delay.

- Upon examination of the sample chromatograms, Aroclor 1260 was determined to be present and was added to the sample data summary for the following samples: 1, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, and 22 (see support data section for further explanation).

6.2.1.3 Support Data

Aroclors 1248, 1254, and 1260 share many of the same components. As a result, when 1260 and 1248 are present, it is not possible to determine if 1254 is also present. However, when 1248 and 1254 were present, it was possible to ascertain that 1260 was present. This was accomplished by examining the later peaks in the chromatogram which, although they are components of 1254, are very minor ones. If the size of the peaks were large enough, 1260 was added utilizing these peaks for quantitation. This was done to obtain a more accurate total PCB concentration. In the case where 1260 and 1248 were reported, although 1254 may in fact be present, the concentrations reported should still reflect the total PCB concentration (see pages 3-15 for sample and standard chromatograms).

Report prepared by Eric Blischke

(215) 687-9510

Date: January 6, 1987

PROJECT NAME: H+H DUC
TDD NO.: F3-8609-04 (SAMPLING)

EPA SITE NO.:
REGION: III

SUPPORT DOCUMENTATION FOR THE REVIEW OF ORGANIC ANALYSIS LAB DATA PACKAGE

CASE/SAS NO.: SAS 2530C
TYPE OF ANALYSIS: PCB
CONTRACT LABORATORY: COMPU-CHEM
APPLICABLE IFB OR SOW:
REVIEWER: ERIC BLISCHKE
REVIEW DATE: 1/6/87

APPLICABLE SAMPLE NO's.: SAS 2530C 1-23

THE FOLLOWING TABLE INDICATES AREAS WHICH WERE EXAMINED IN DETAIL, THE IDENTIFIED PROBLEM AREAS, AND SUPPORT DOCUMENTATION ATTACHMENTS:

	AREAS EXAMINED IN DETAIL (CHECK (✓) IF YES OR FOOTNOTE LETTER FOR COMMENTS BELOW)				PROBLEM AREAS IDENTIFIED (CHECK (✓) IF YES OR FOOTNOTE NUMBER FOR COMMENTS BELOW)				SUPPORT DOCUMENTATION ATTACHMENTS (CHECK (✓) IF YES OR IDENTIFY ATTACHMENT NO.)			
	ALL APPLICABLE ANALYSES	VOA	BNA	PEST/PCB	ALL APPLICABLE ANALYSES	VOA	BNA	PEST/PCB	ALL APPLICABLE ANALYSES	VOA	BNA	PEST/PCB
HOLDING TIMES				✓								
BLANK ANALYSIS RESULTS: TARGET COMPOUNDS				✓								
BLANK ANALYSIS RESULTS: TENTATIVE I.D.s												
SURROGATE SPIKE RESULTS				✓								
MATRIX SPIKE RESULTS				✓								
DUPLICATE ANALYSIS RESULTS				✓								
TARGET COMPOUND MATCHING QUALITY				✓								
TENTATIVELY IDENTIFIED COMPOUNDs												
DFTPP & BFB SPECTRUM TUNE RESULTS												
GC INSTRUMENT PERFORMANCE				✓								
INITIAL CALIBRATIONS				✓								
CONTINUING CALIBRATIONS				✓								
QUANTITATION OF RESULTS				✓								
OTHERS												

COMMENTS: DATA PACKAGE WAS FOR PCB'S ONLY

AR100347

BLANK ANALYSIS RESULTS FOR TARGET COMPOUNDS

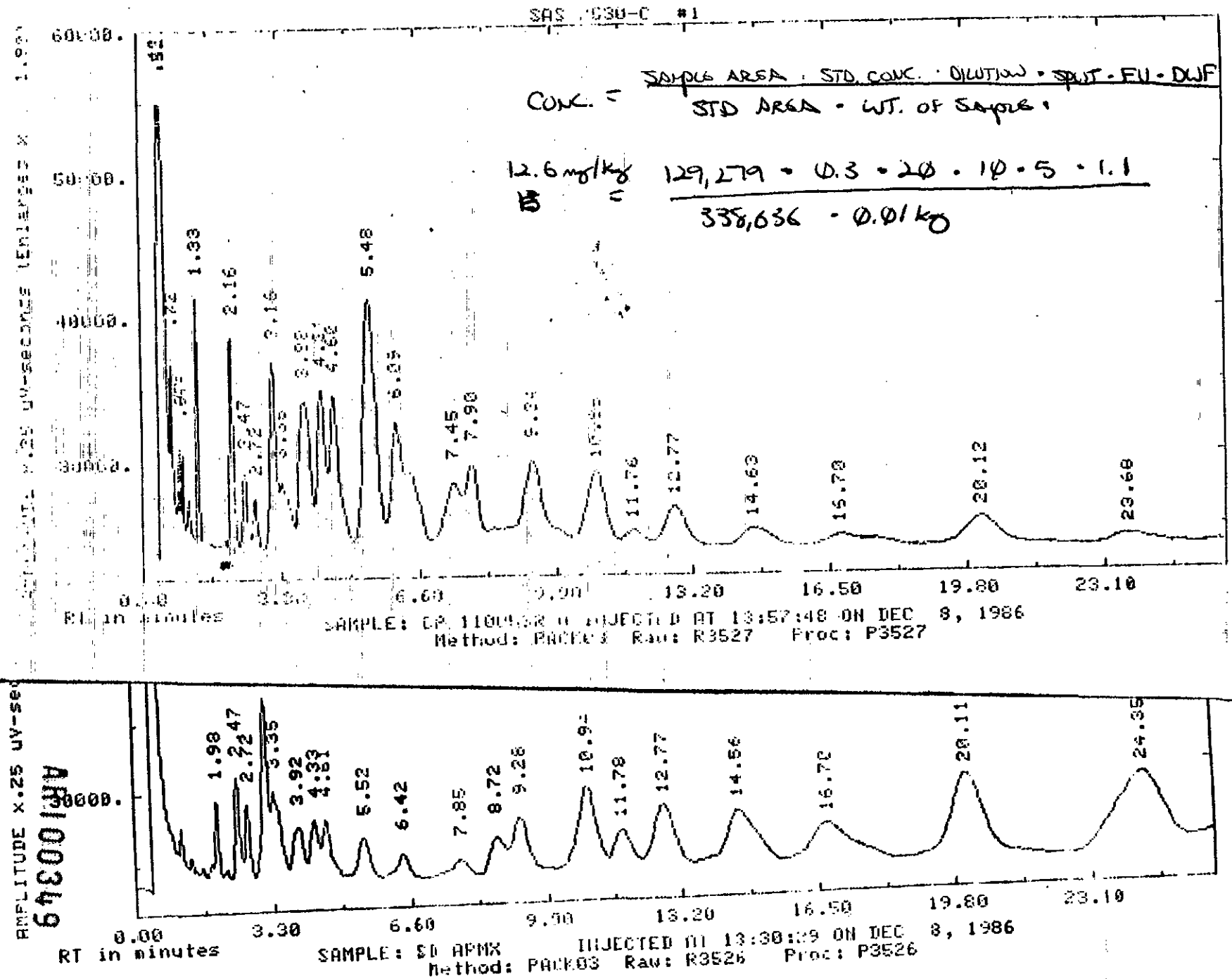
FRACTION	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
						NO PCB'S FOUND IN ANY BLANKS

ABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN THE AMPLE ANALYTICAL DATA SUMMARY. TENTATIVELY IDENTIFIED COMPOUNDS IN BLANKS ARE LISTED ON A SEPARATE FOR

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

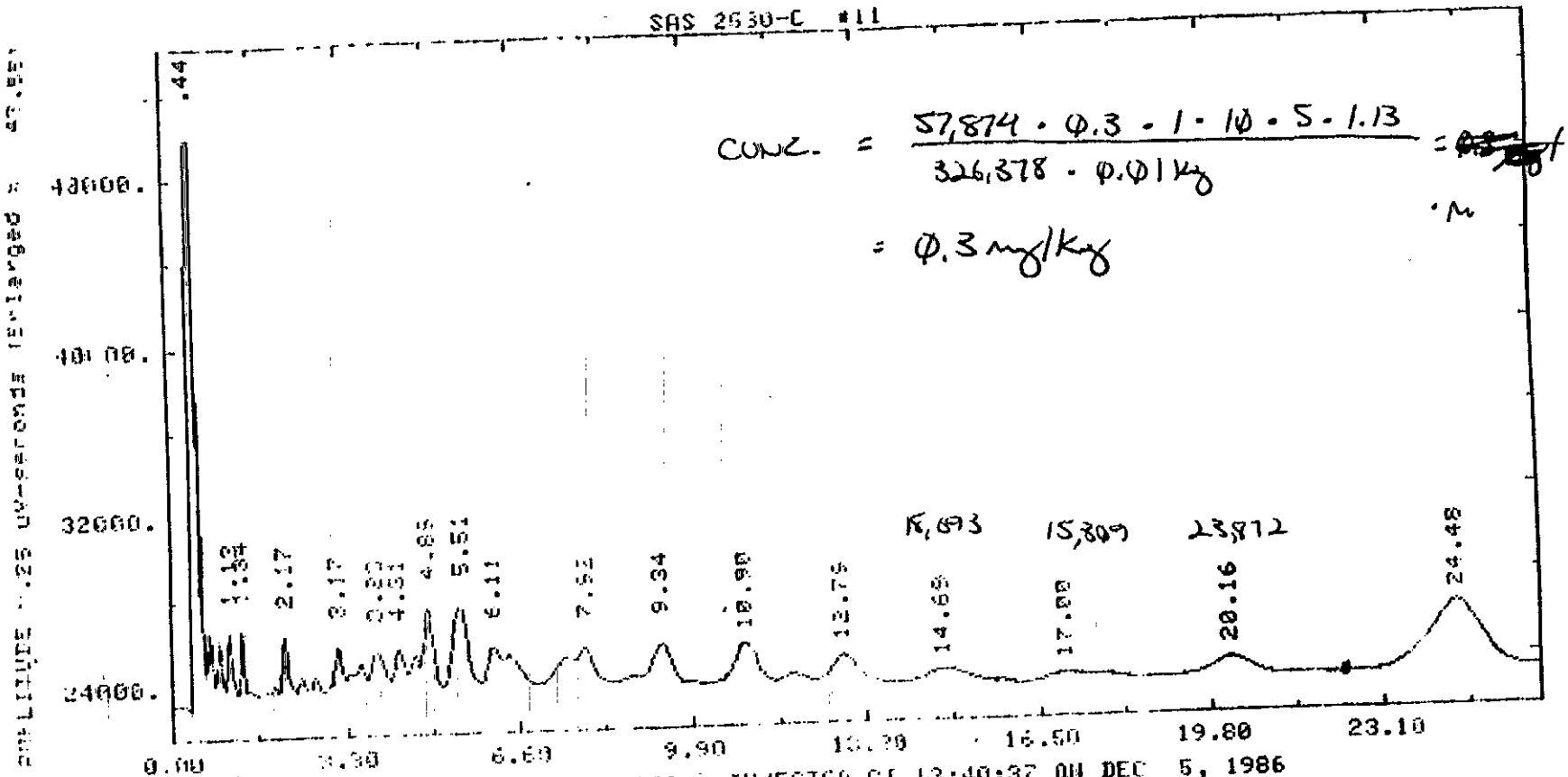
(2) RESULT INFERRED FROM QUANTITATION LIST, DIAGNOSTICS, CHROMATOGRAM AND/OR SPECTRA.



CONC. = (SAMPLE AREA · STD. CONC. · DILUTION · SPLIT · FU · DWF) / (STD AREA · WT. OF SAMPLE)

12.6 mg/kg = (129,279 · 0.3 · 20 · 10 · 5 · 1.1) / (338,636 · 0.01 kg)

(3)

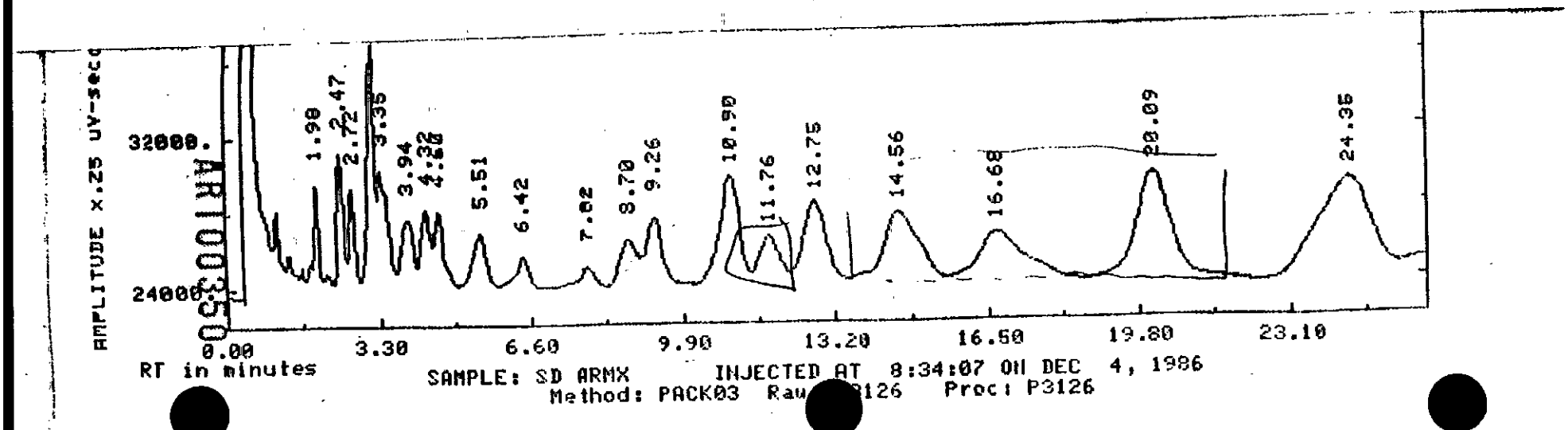


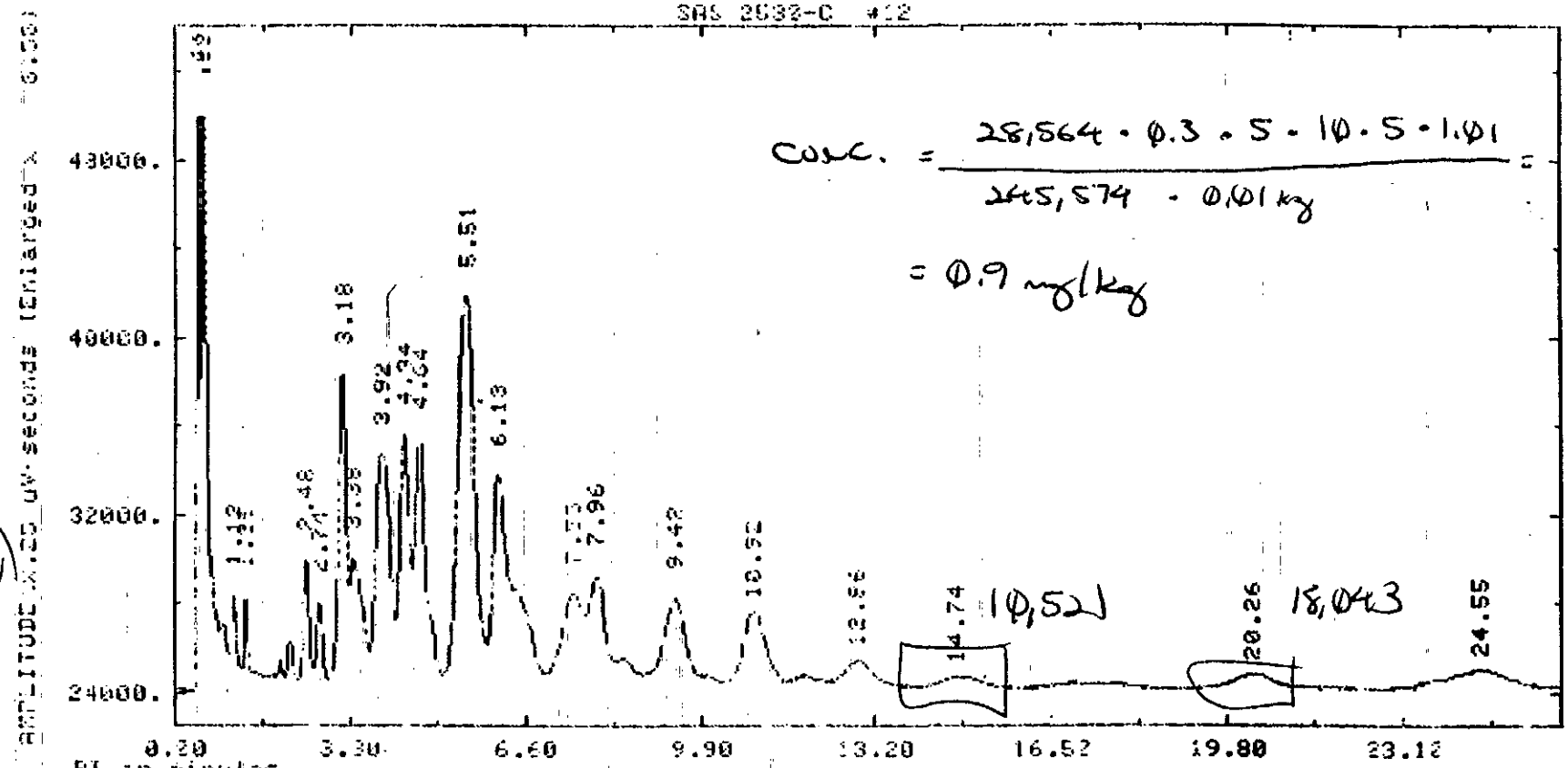
$$\text{CONC.} = \frac{57{,}874 \cdot 0.3 \cdot 1 \cdot 10 \cdot 5 \cdot 1.13}{326{,}378 \cdot 0.01\,kg} = \text{[illegible]}$$

$$= 0.3\ mg/kg$$

K, 693 15,309 23,872

(4)





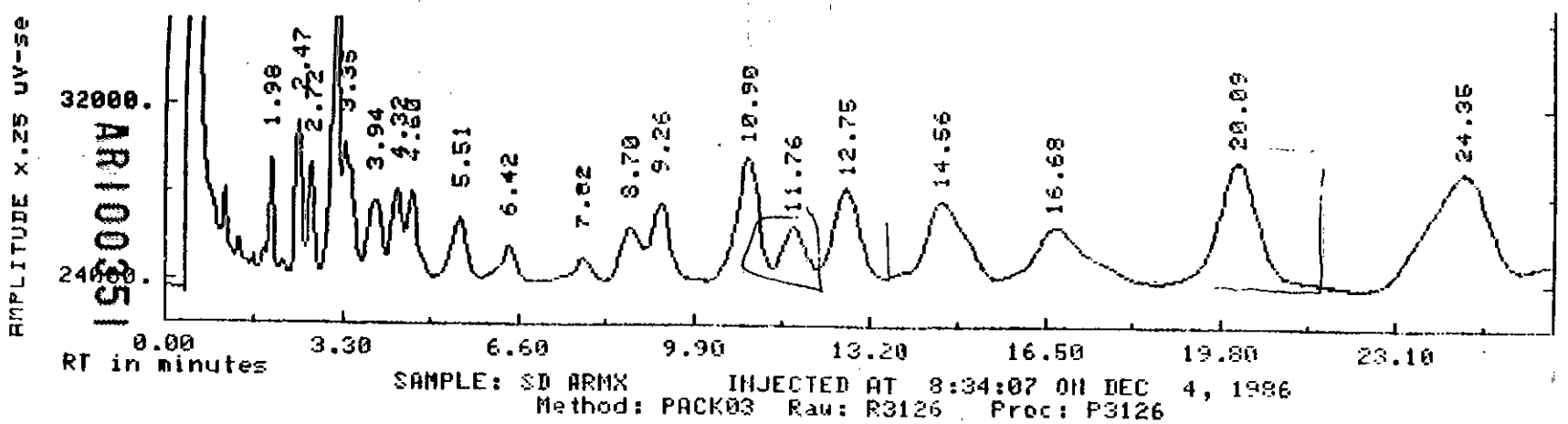
$$\text{Conc.} = \frac{28{,}564 \cdot 0.3 \cdot 5 \cdot 10 \cdot 5 \cdot 1.01}{245{,}574 \cdot 0.01\ kg} = 88\ mg/kg$$

$$= 0.9\ mg/kg$$

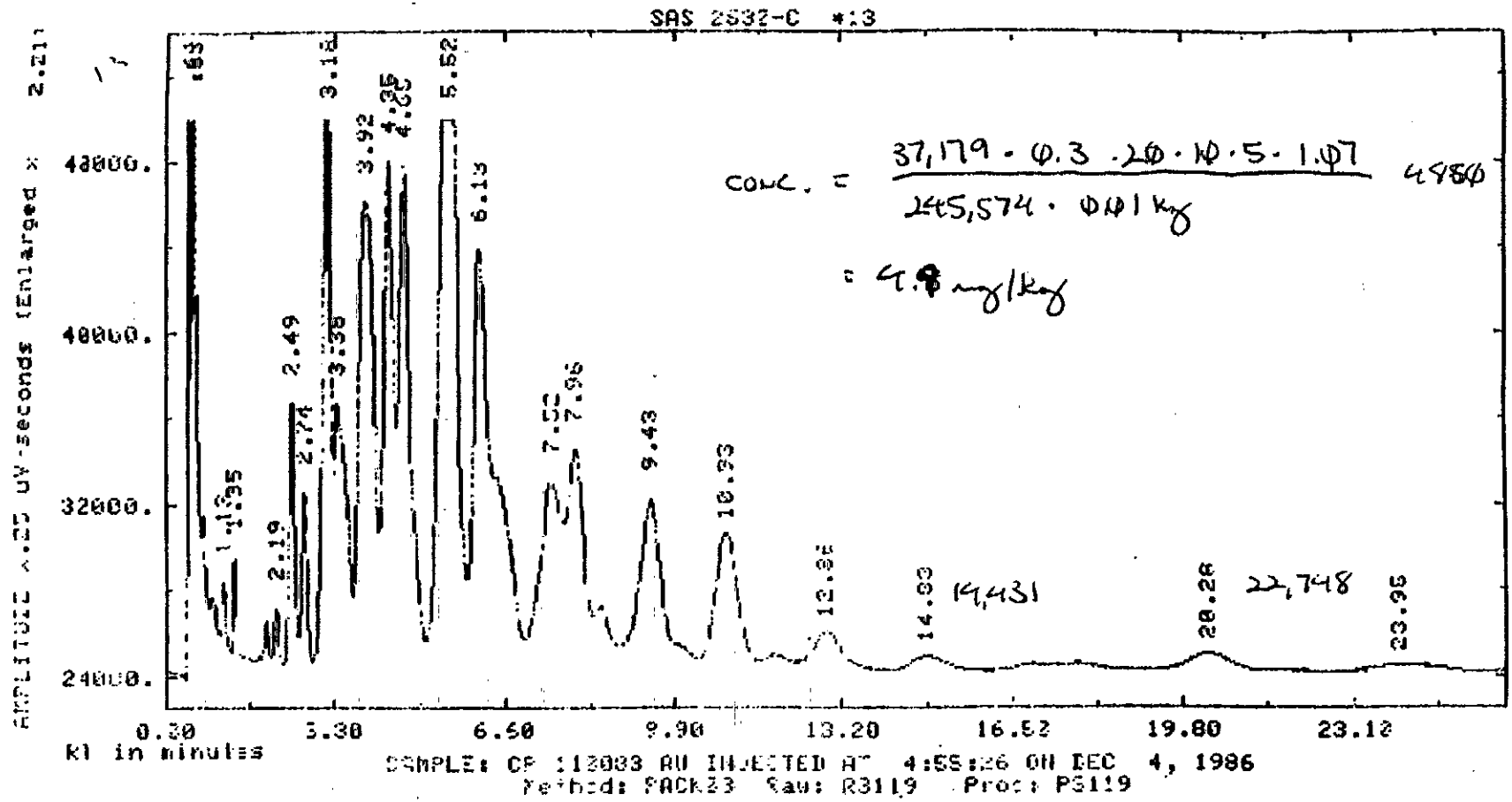
10,521

18,043

(5)



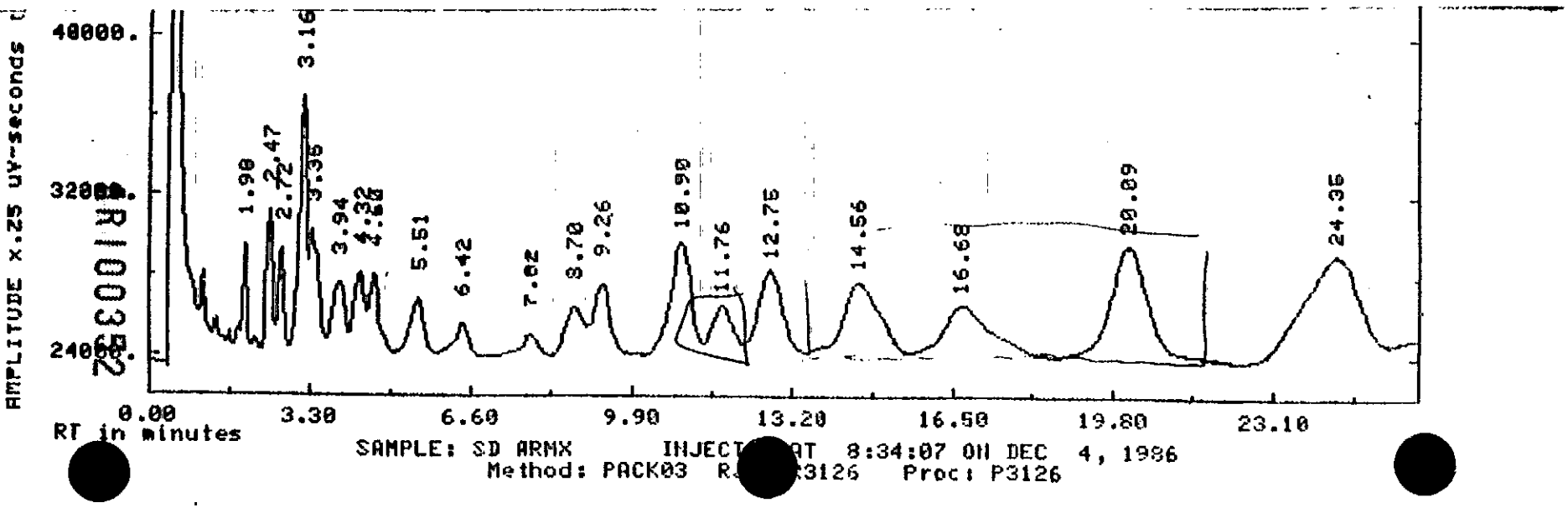
ARI0051



$$\text{CONC.} = \frac{37{,}179 \cdot 0.3 \cdot 20 \cdot 10 \cdot 5 \cdot 1.07}{245{,}574 \cdot 0.01\ \text{kg}} \quad 4980$$

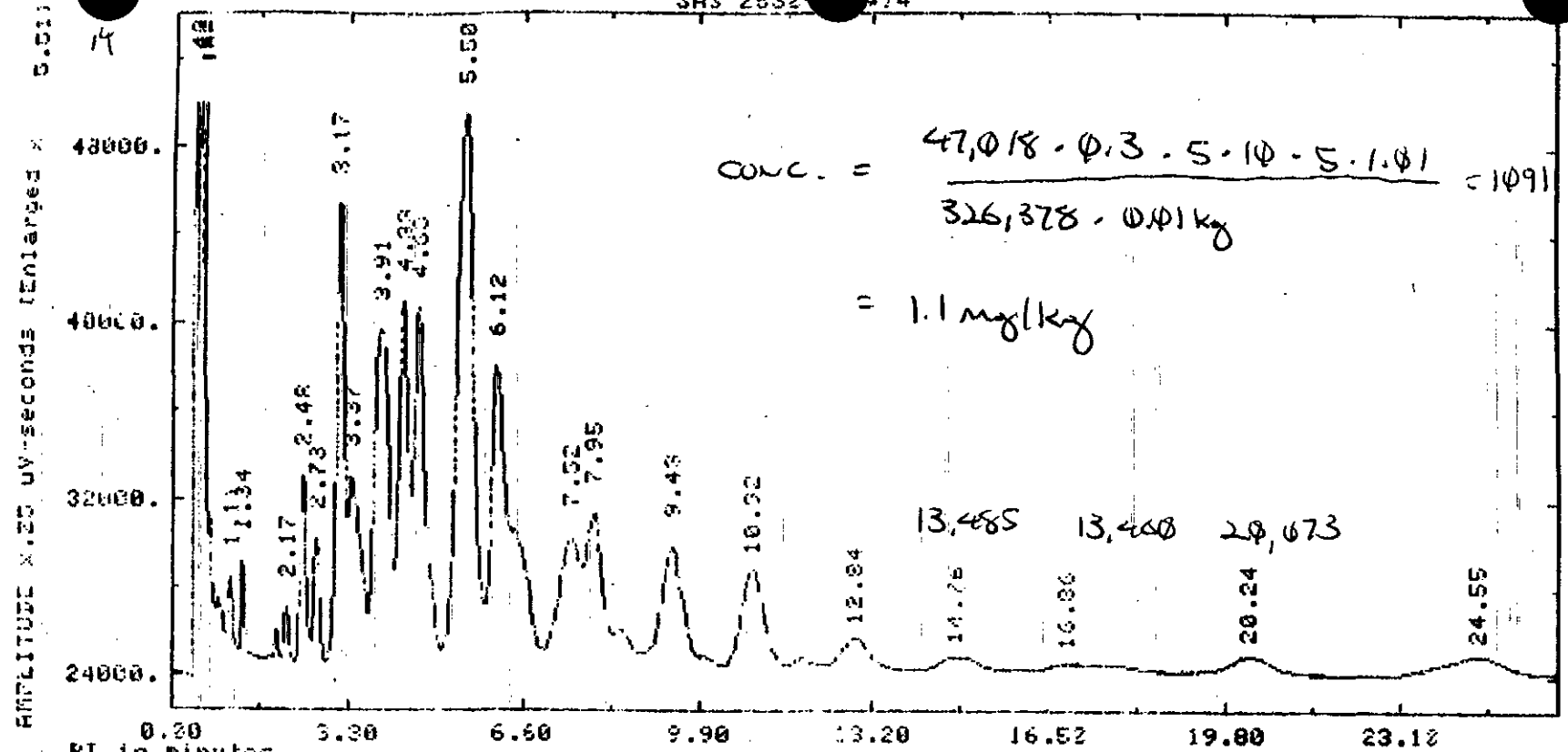
$= 4.9\ \text{mg/kg}$

(8)



ARI00352

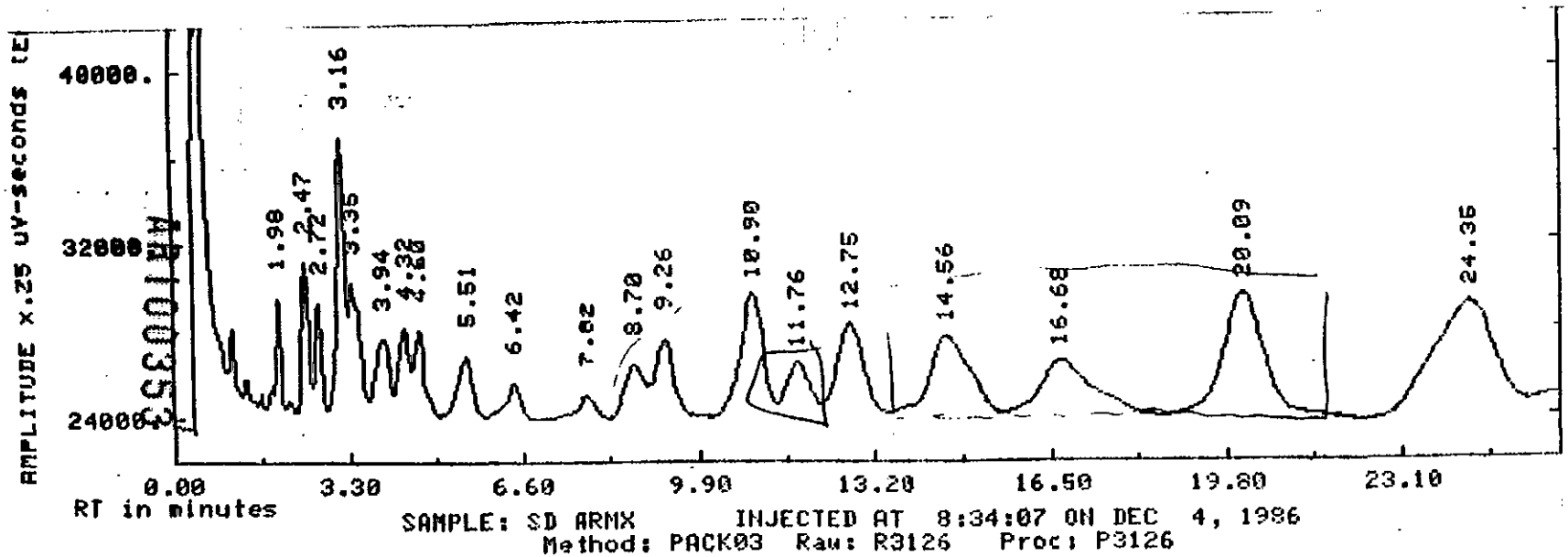
ARI00352

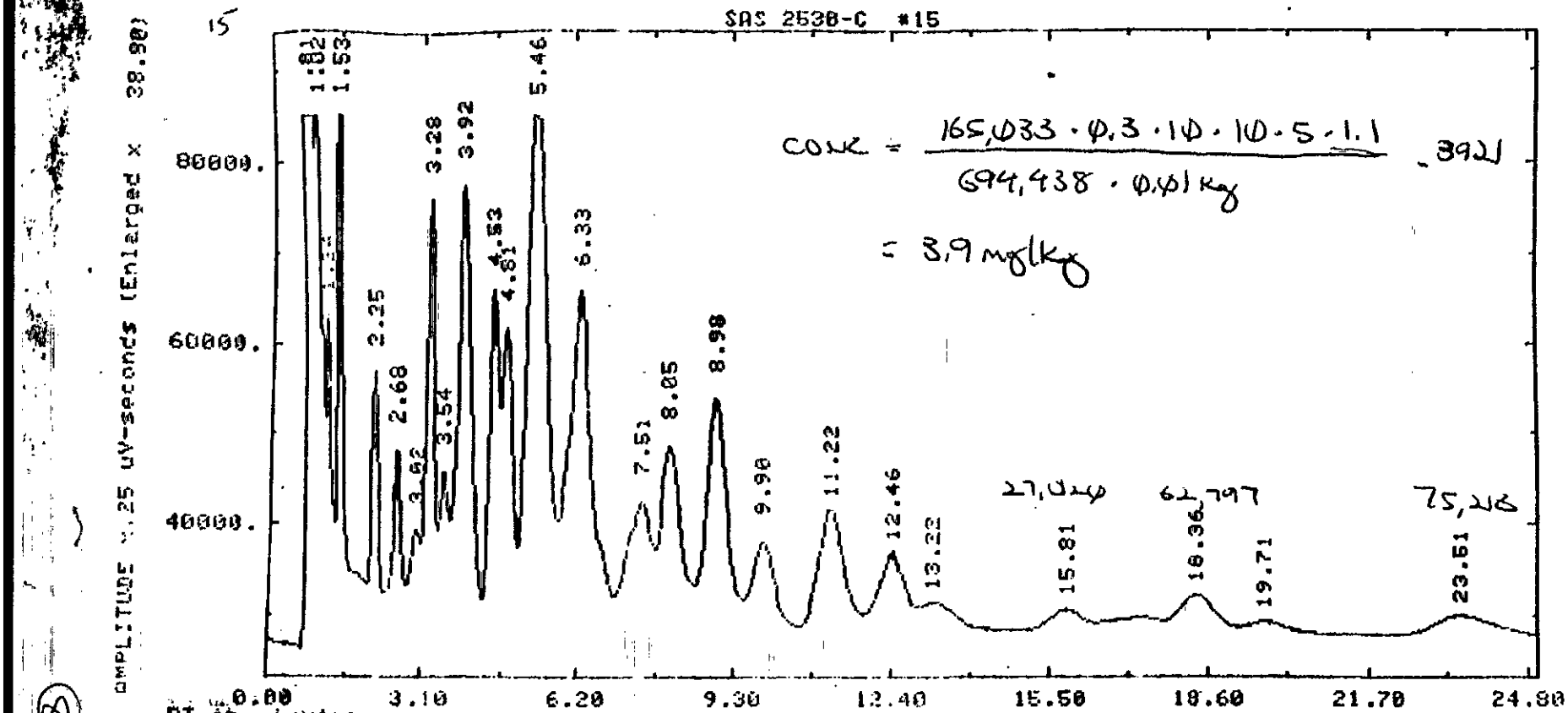


conc. = $\frac{47,018 \cdot 0.3 \cdot 5 \cdot 10 \cdot 5 \cdot 1.01}{326,378 \cdot 0.01\ kg}$ = 1091

= 1.1 mg/kg

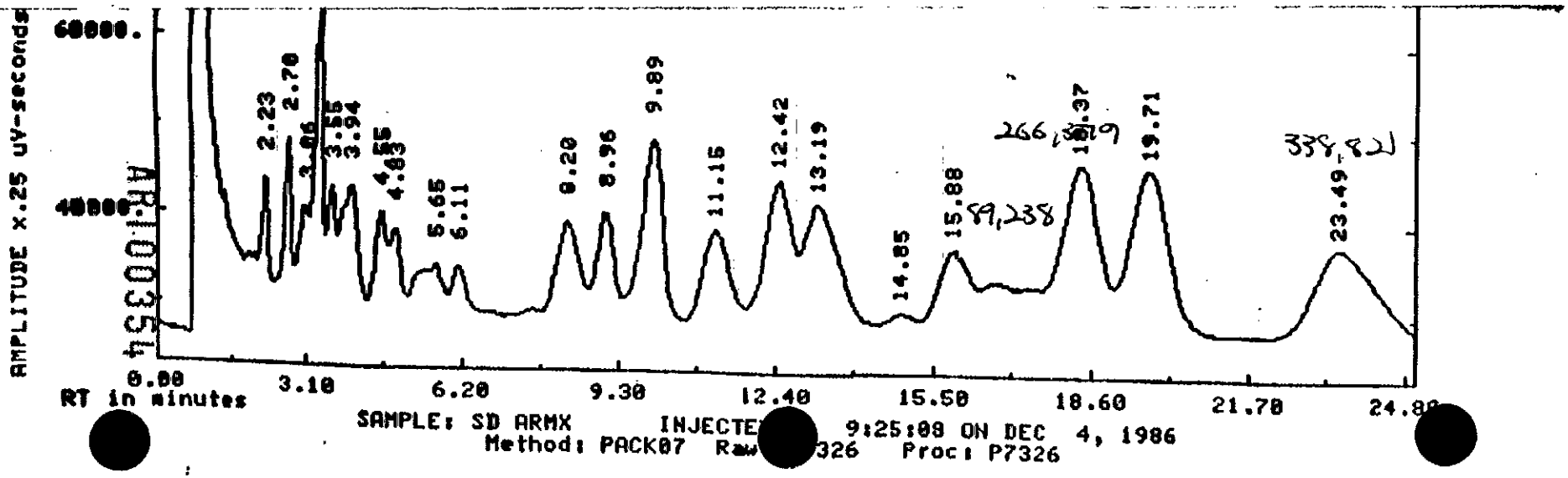
13,485 13,400 20,673

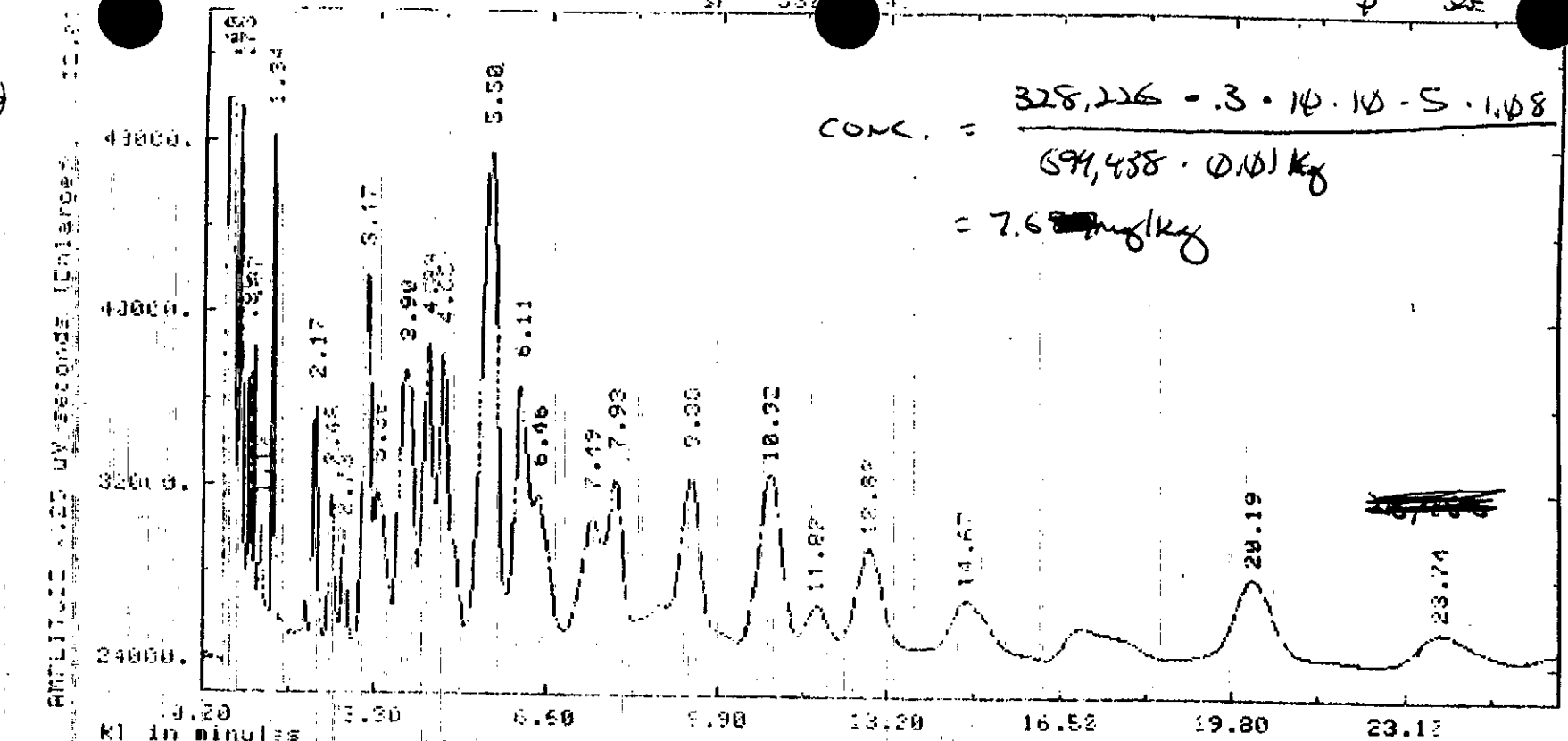




$$\text{conc} = \frac{165{,}033 \cdot 0.3 \cdot 10 \cdot 10 \cdot 5 \cdot 1.1}{694{,}438 \cdot 0.01\ \text{kg}} \cdot 392$$

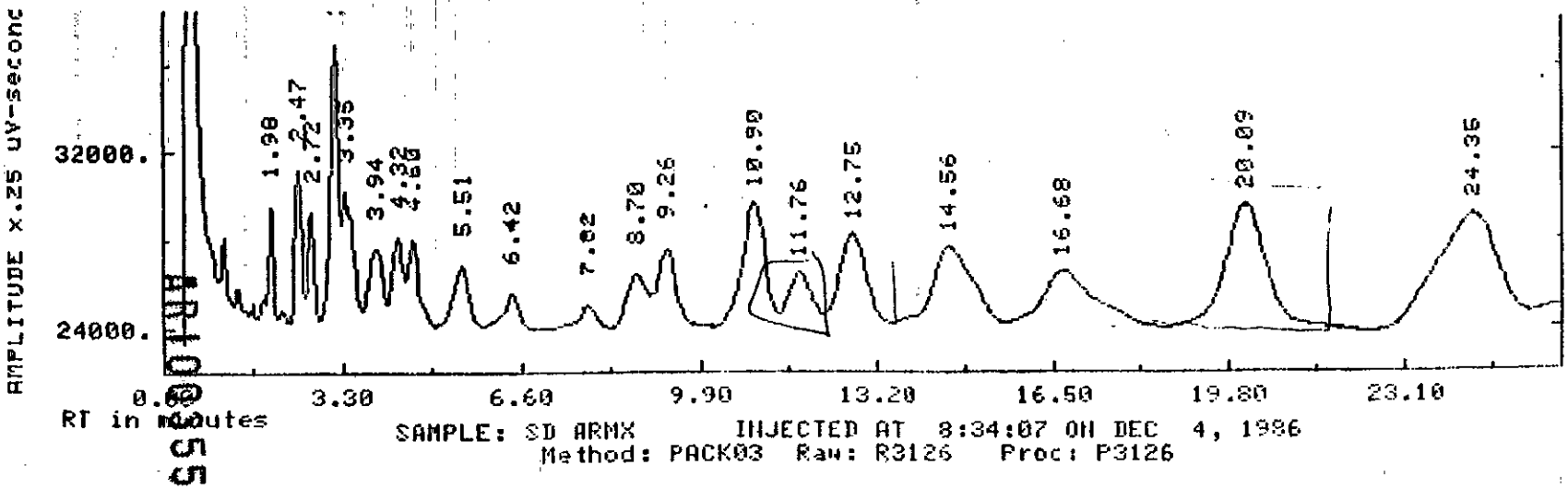
$$= 3.9\ \text{mg/kg}$$



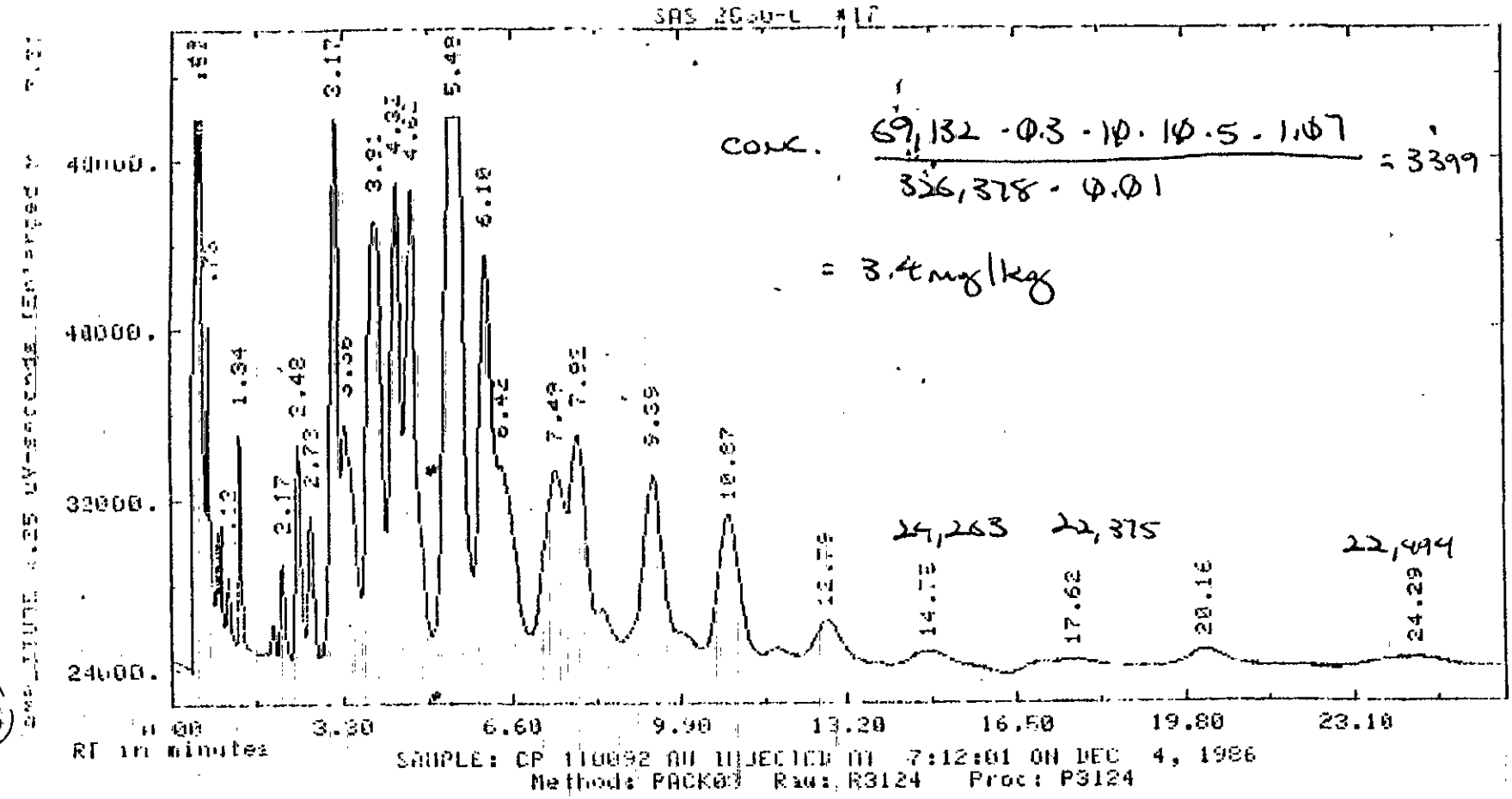


$$\text{CONC.} = \frac{328{,}226 \cdot .3 \cdot 10 \cdot 10 - 5 \cdot 1.08}{694{,}488 \cdot 0.01\ \text{kg}}$$

$$= 7.6\ \text{mg/kg}$$

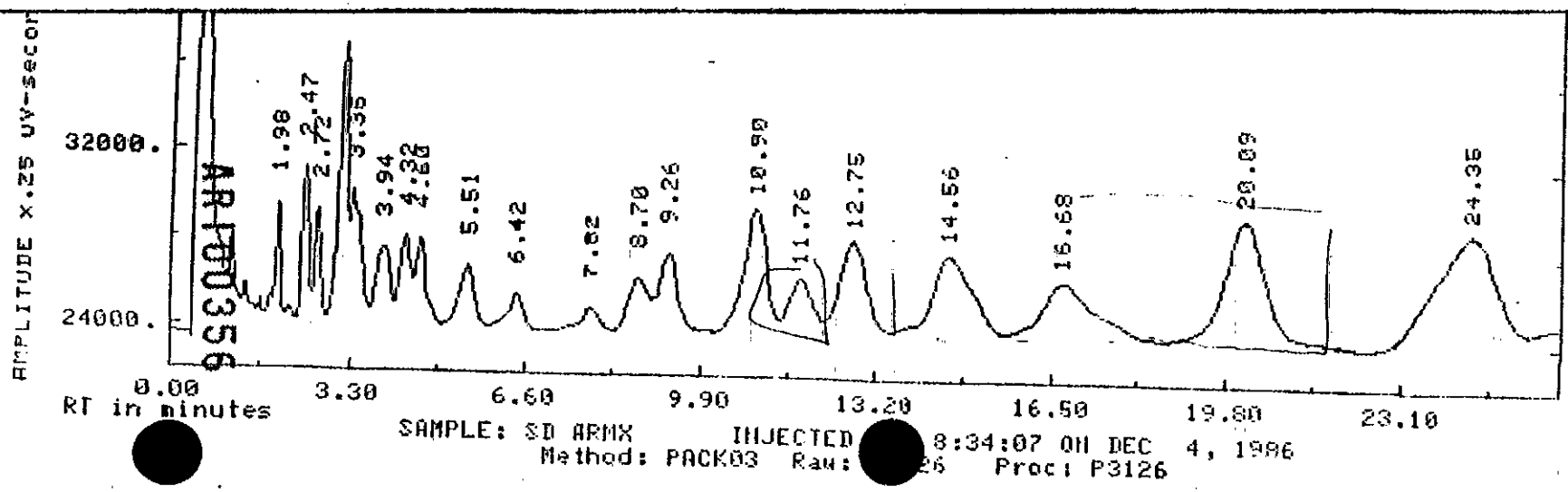


ARI00355



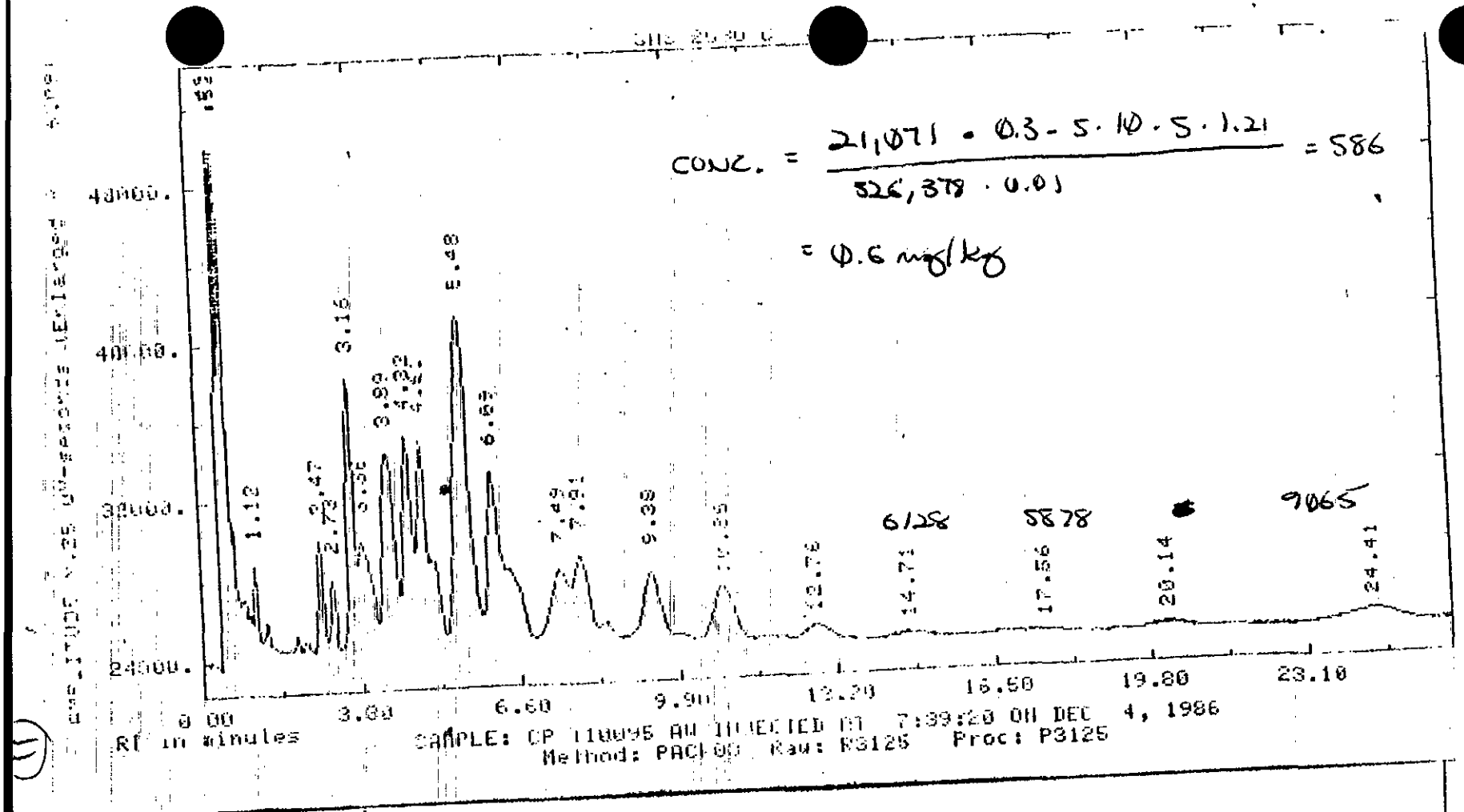
conc. $\frac{69,132 \cdot 0.3 \cdot 10 \cdot 10.5 \cdot 1.07}{326,378 \cdot 0.01} = 3399$

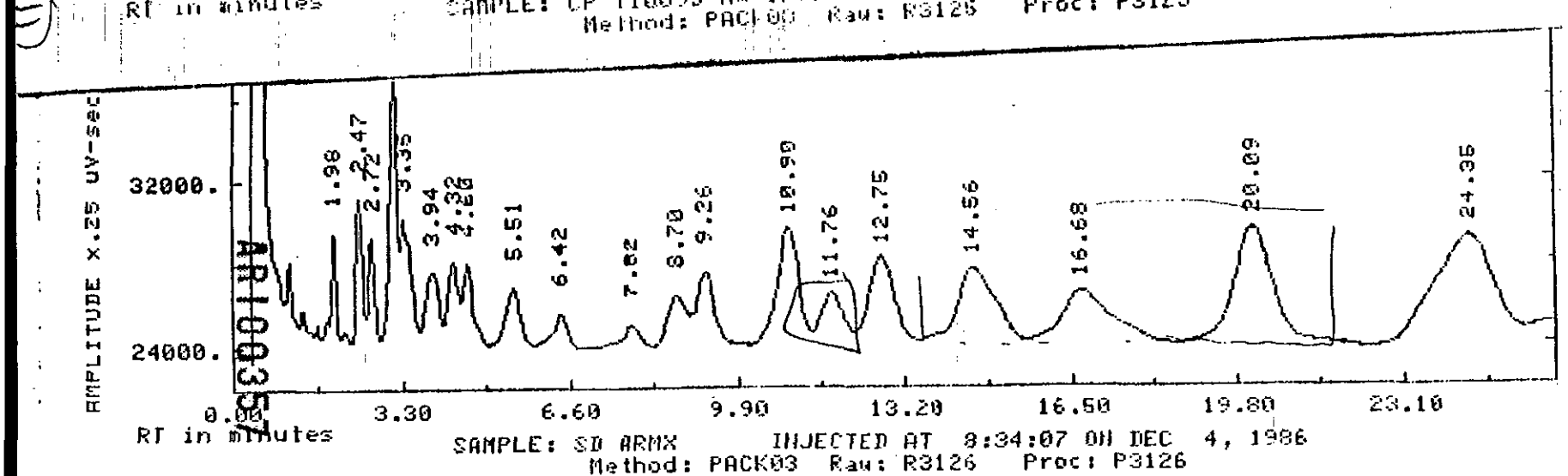
$= 3.4 \text{ mg/kg}$



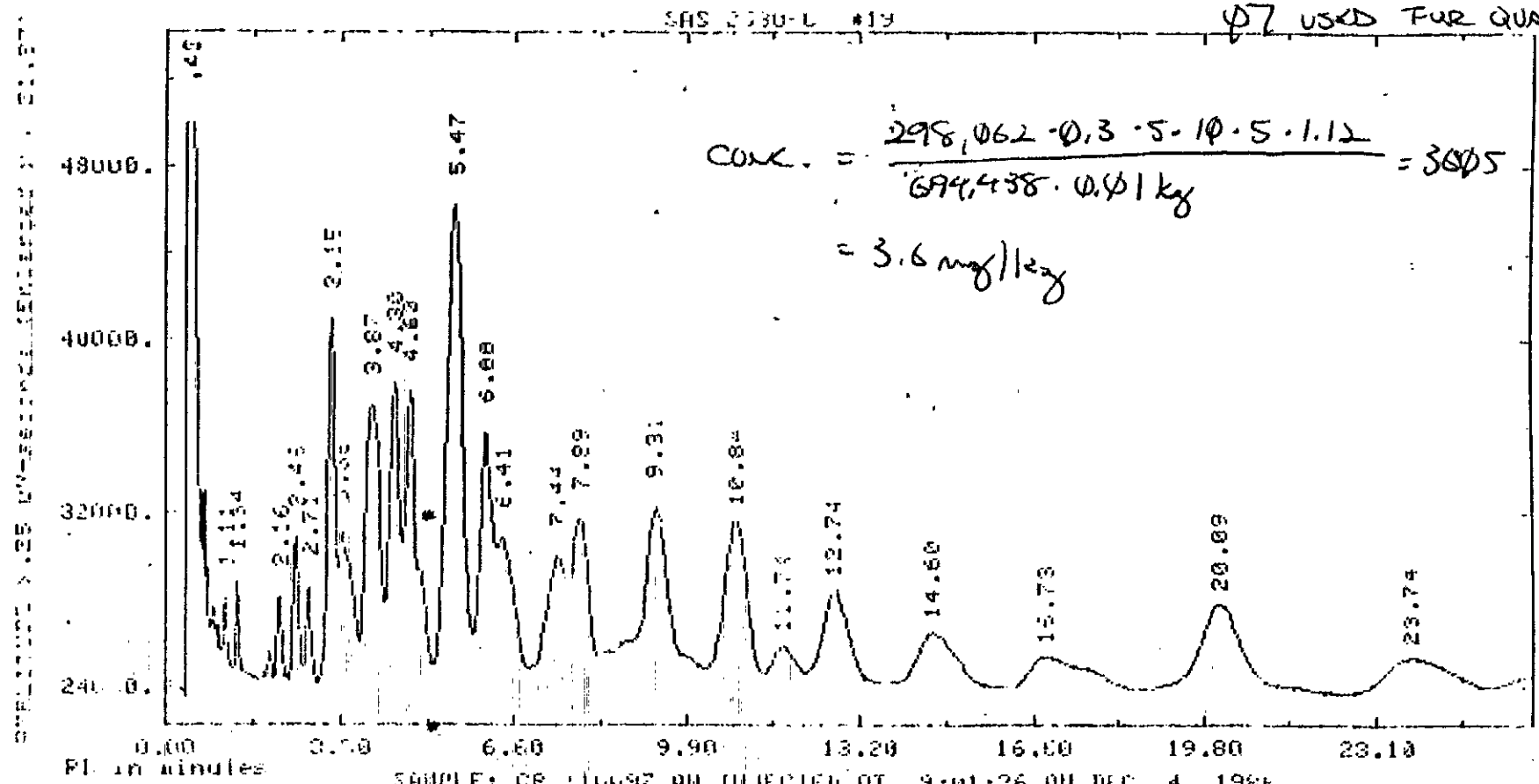
$$\text{CONC.} = \frac{21{,}071 \cdot 0.3 - 5 \cdot 10 \cdot 5 \cdot 1.21}{326{,}378 \cdot 0.01} = 586$$

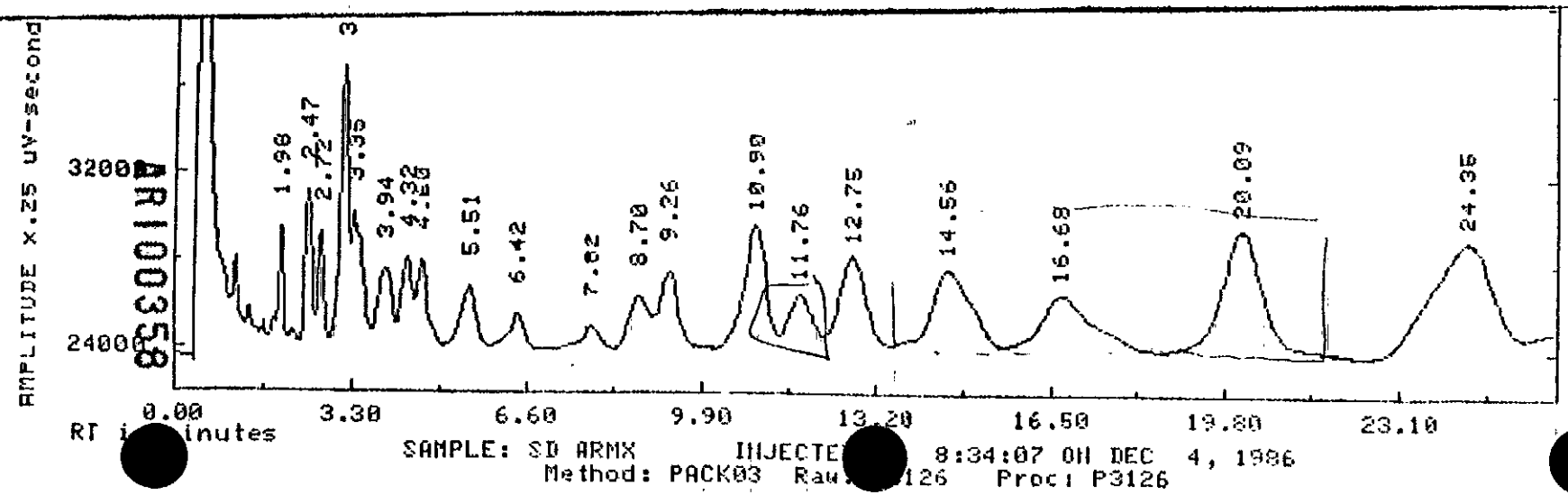
$= 0.6$ mg/kg



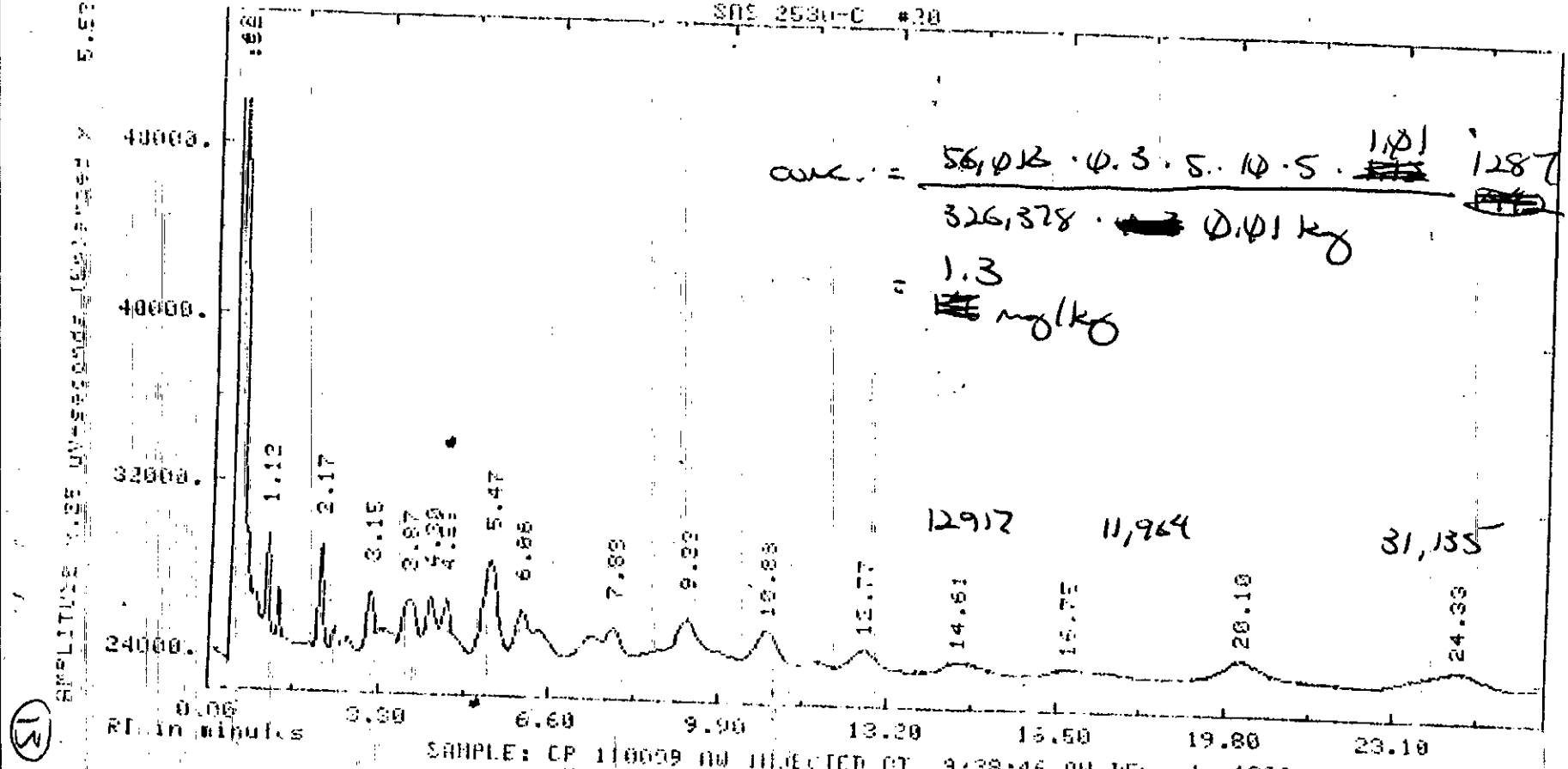


ARI0035


SAS 3230-L #19
Φ7 USED FOR QUANT
CONC. = 298,062 · 0.3 · 5 · 10 · 5 · 1.12 / 699,438 · 0.01 kg = 3005
= 3.6 mg/kg
AMPLITUDE x.25 UV-second
48000.
40000.
32000.
24000.
0.00
3.30
6.60
9.90
13.20
16.50
19.80
23.10
RT in minutes
SAMPLE: CF 11697 AN INJECTED AT 9:01:26 ON DEC 4, 1986
Method: PACK03 Raw: R3127 Proc: P3127

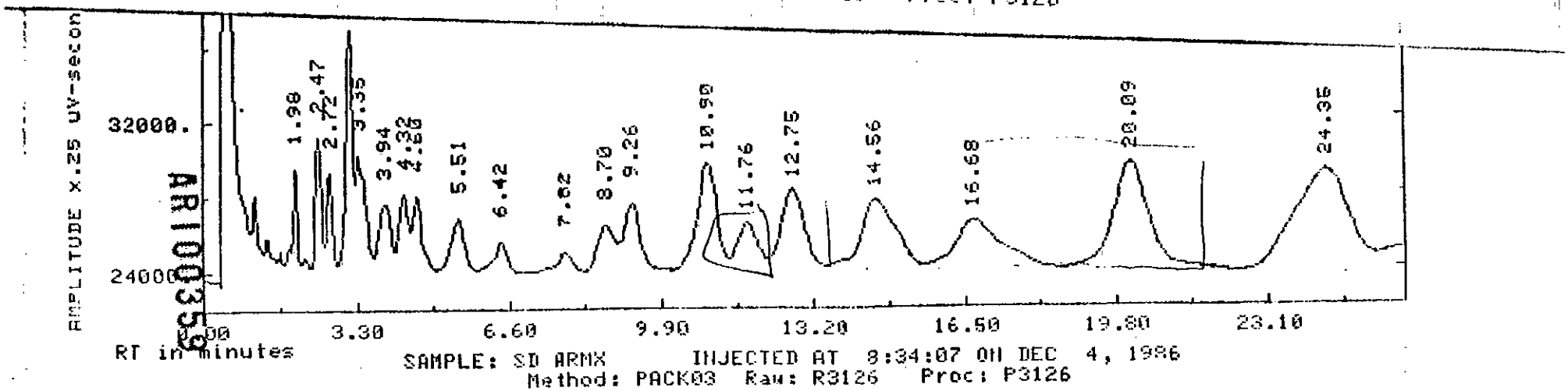

AMPLITUDE x.25 UV-second
3200
2400
0.00
3.30
6.60
9.90
16.50
19.80
23.10
RT in minutes
SAMPLE: SD ARMX INJECTED 8:34:07 ON DEC 4, 1986
Method: PACK03 Proc: P3126

A10358

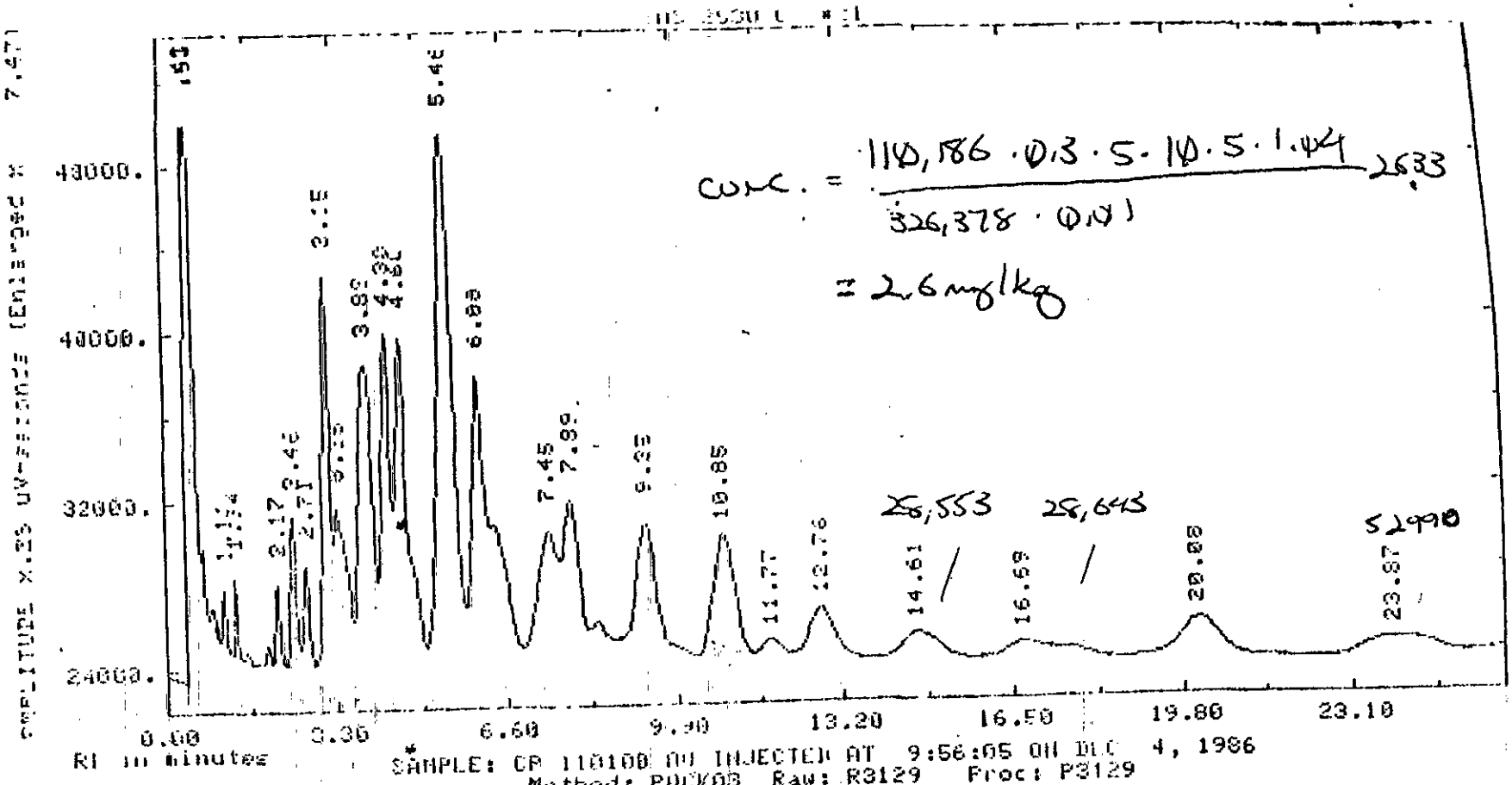


$$\text{conc.} = \frac{56{,}048 \cdot 0.3 \cdot 5 \cdot 10 \cdot 5 \cdot 1{,}101 \;/\; 1287}{326{,}378 \cdot \text{[illegible]}\ 0.01\ \text{kg}} = 1.3\ \text{mg/kg}$$

12917 11,964 31,135



ARI0039



$$\text{conc.} = \frac{110{,}186 \cdot 0.3 \cdot 5 \cdot 10 \cdot 5 \cdot 1.44}{326{,}378 \cdot 0.01} \frac{2633}{}$$

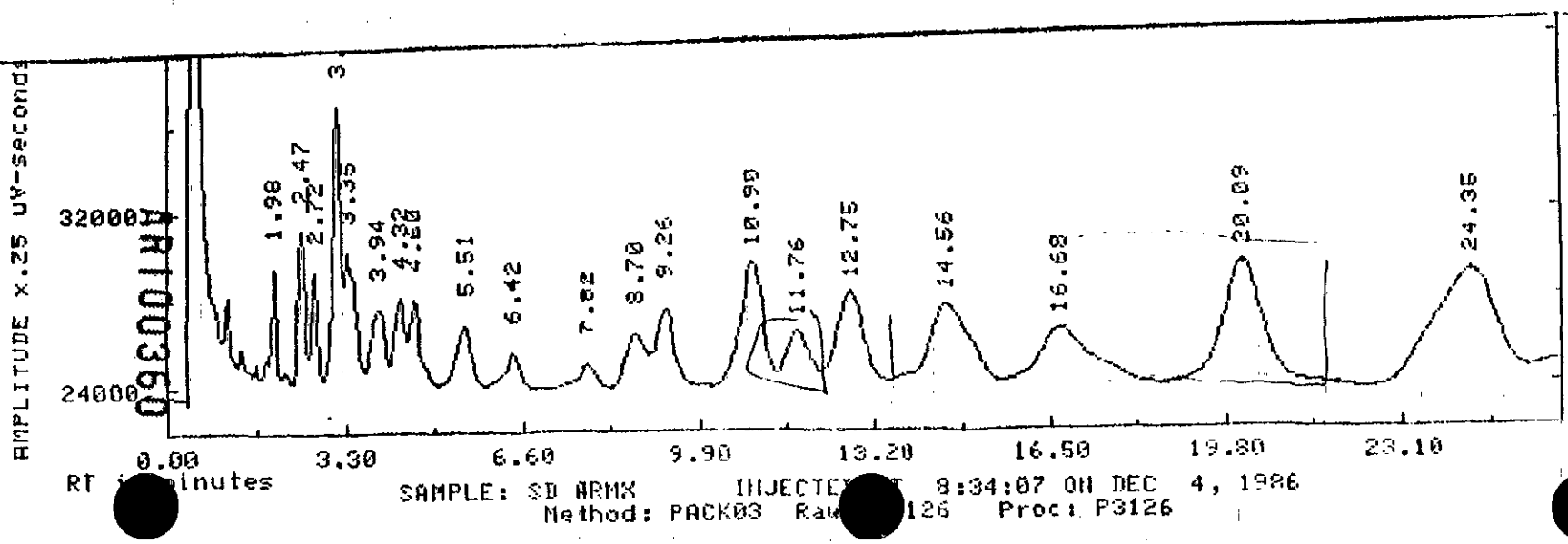
$$= 2.6 \text{ mg/kg}$$

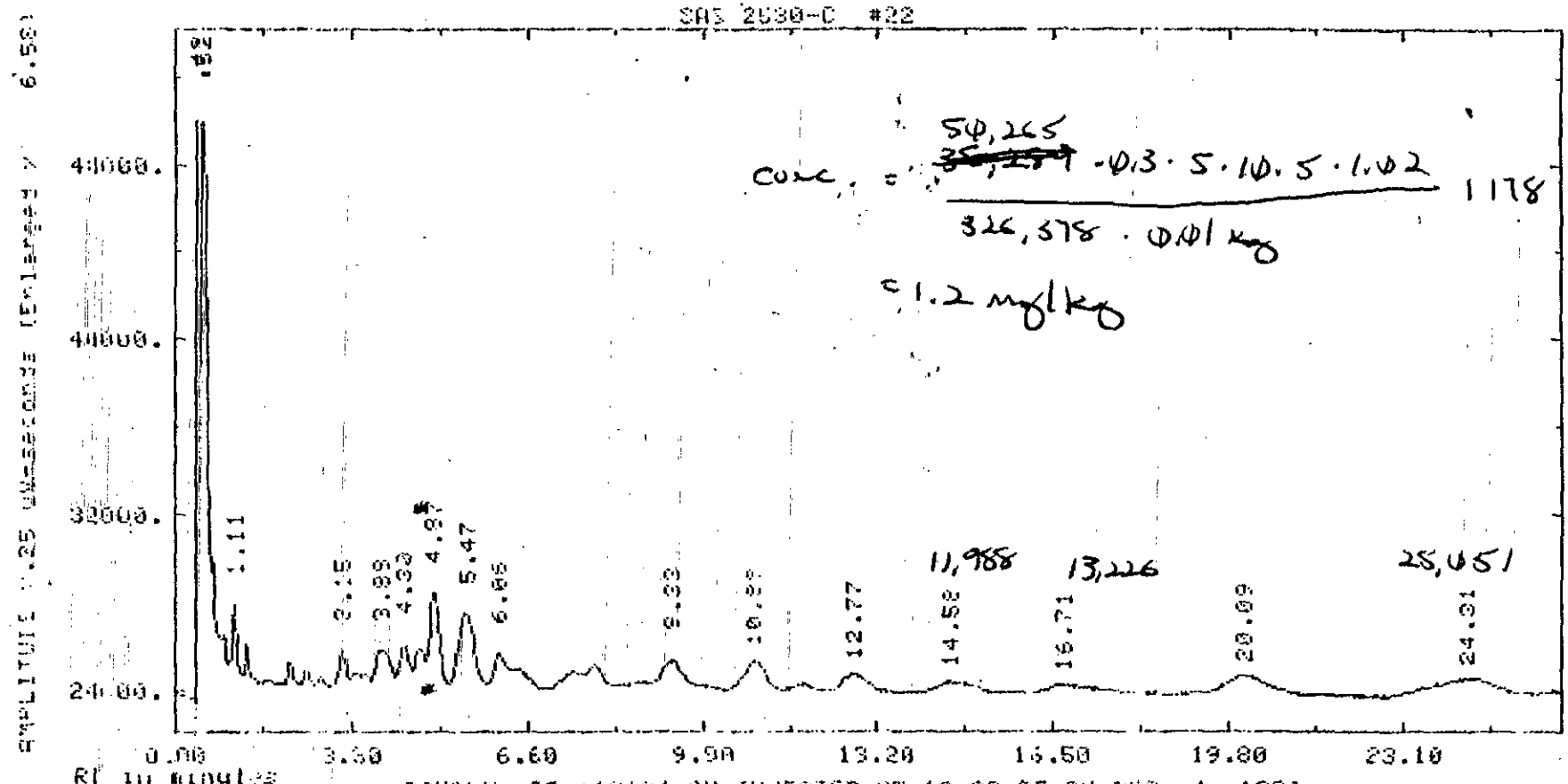
26,553

26,643

52990

(4)





$$\text{Conc.} = \frac{50{,}265 - 35{,}259 \cdot 0.3 \cdot 5 \cdot 10.5 \cdot 1.02}{326{,}578 \cdot 0.01\ \text{kg}} = 1178$$

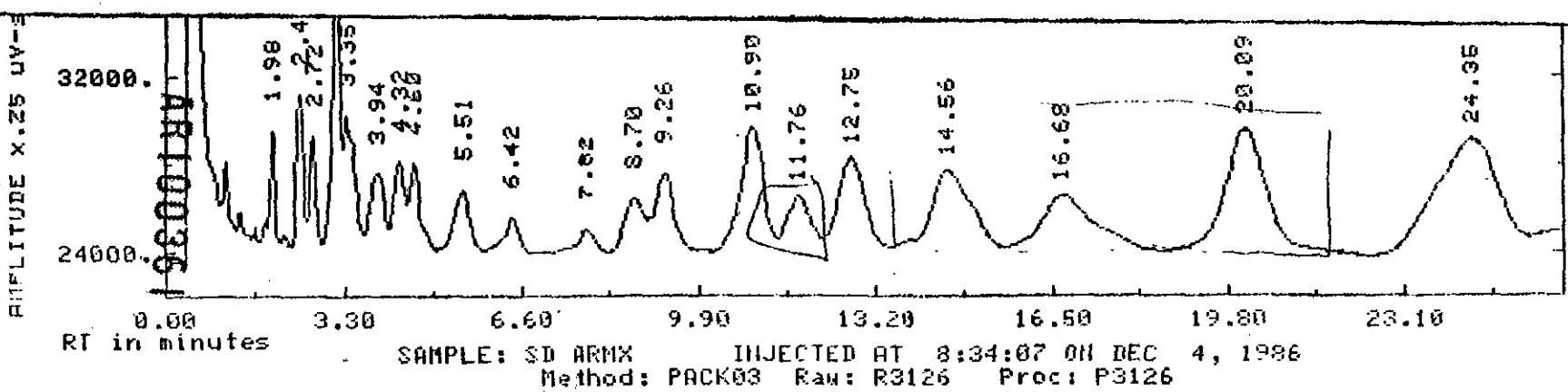
≈ 1.2 mg/kg

11,988

13,226

25,051

(1)



SOIL SURROGATE PERCENT RECOVERY SUMMARY

Case No. SAS2530C Contract Laboratory COMPUCHEM Contract No. 68-01-7263

Low X Medium _____

	VOLATILE				SEMI-VOLATILE							PESTICIDE
EPA SAMPLE NO.	TOLUENE-D8 (81-117)	BFB (74-121)	1,2 DICHLOROETHANE-D4 (70-121)	NITRO-BENZENE-D5 (23-120)	2-FLUORO-BIPHENYL (30-115)	TERPHENYL-D14 (18-137)			PHENOL-D6 (24-113)	2-FLUORO-PHENOL (25-121)	2,4,6 TRIBROMO-PHENOL (19-122)	DIBUTYL-CHLORENDATE (50-150)
2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	*
3												135
5												60
6												80
10												*
12												69
13												72
14												120
15												86
16												124
17												70
18												78
19												60
20												108
												112
												121

(2A)

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

** ADVISORY LIMITS ONLY

Volatiles: _____ out of _____ ; outside of QC limits

Semi-Volatiles: _____ out of _____ ; outside of QC limits

Pesticides: _____ out of _____ ; outside of QC limits

7/85

Comments: 0 0 3 5 2

FORM II

ORGANICS ANALYSIS DATA SUMMARY

Case No. [illegible] Contract Laboratory [illegible] Contract No. 68-01-7263

Low X Medium ____

SAMPLE TRACFIC NO.	VOLATILE				SEMI-VOLATILE							PESTICIDE
	TOLUENE-D8 (81-117)	BFB (74-121)	1,2 DICHLOROETHANE-D4 (70-121)	NITROBENZENE-D5 (23-120)	2-FLUOROBIPHENYL (30-115)	TERPHENYL-D14 (18-137)			PHENOL-D6 (24-113)	2-FLUOROPHENOL (25-121)	2,4,6 TRIBROMOPHENOL (19-122)	DIBUTYLCHLORENDATE ** (20-150)
21	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	120
22												116
23												80
6												DL *
9												DL *
[illegible]												84
[illegible]												88
[illegible]												94
[illegible]												96

(1)

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

** ADVISORY LIMITS ONLY

Volatiles: ____ out of ____ ; outside of QC limits

Semi-Volatiles: ____ out of ____ ; outside of QC limits

Pesticides: 2 out of 9 ; outside of QC limits

7/85

Comments:

SOIL SURROGATE PERCENT RECOVERY SUMMARY

Case No. [illegible] Contract Laboratory [illegible] Contract No. 68-01-7263

Low X Medium ____

	VOLATILE						SEMI-VOLATILE					PESTICIDE
SMO TRAFFIC NO.	TOLUENE-D8 (81-117)	BFB (74-121)	1,2 DICHLOROETHANE-D4 (70-121)	NITRO-BENZENE-D5 (23-120)	2-FLUORO-BIPHENYL (30-115)	TERPHENYL-D14 (18-137)			PHENOL-D6 (24-113)	2-FLUORO-PHENOL (25-121)	2,4,6 TRIBROMO-PHENOL (19-122)	DIBUTYL-CHLORENDATE (50-150) **
11671	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	94
[illegible]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	96
[illegible]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	108

(4)

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

** ADVISORY LIMITS ONLY

Volatiles: ____ out of ____ ; outside of QC limits

Semi-Volatiles: ____ out of ____ ; outside of QC limits

Pesticides: 0 out of 3 ; outside of QC limits

7/85

Comments: 2 0 3 5

FORM II

WATER MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. SAS#7530 Contractor COMPUCHEM LABORATORIES Contract No. 68-01-7263

FRACTION	COMPOUND	CONC. SPIKE ADDED (UG/L)	SAMPLE RESULT	CONC. MS	% REC.	CONC. MSD	% REC.	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
SMO SAMPLE NO. # 1	125A PCB	—	—	—	— *	—	— *	—		

*SEE QUALITY ASSURANCE NOTICE

(19)

Comments: _____

FORM III

Form III - Water Matrix Spike/Matrix Spike Duplicate Recovery

AR100365

WATER MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. [illegible] Contractor COMPUCHEM LABORATORIES Contract No. 68-01-7263

FRACTION	COMPOUND	CONC. SPIKE ADDED (UG/L)	SAMPLE RESULT	CONC. MS	% REC.	CONC. MSD	% REC.	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
SMO SAMPLE NO. # 23	1254 PCB				110		111	0		

*SEE QUALITY ASSURANCE NOTICE

(8)

Comments: _____

FORM III

Form III - Water Matrix Spike/Matrix Spike Duplicate Recovery

AR100366

Analysis Worksheet

CompuChem Number 110054 Case# SAS 2530- EPA# BS

Volume/weight extracted = 10.00 g Final Extract Volume = 5.00 ml Split = 10.0 Dry Weight Factor = 1.00

$$\text{Concentration} = \frac{\text{Sample Area} * \text{Standard Conc} * \text{Dilution} * \text{Split} * \text{Final Volume} * \text{Dry Weight Factor}}{\text{Standard Area} * \text{Volume or Weight of Sample}}$$

File : P7739 Column : MIXED Dilution Factor : 1.0 Detection Level Factor : 1.50

% Recovery

Aroclor - 1254	Standard RT window -	8.78 - 9.14	Sample RT -	8.96	127%
	Standard Area -	600998	Sample Area -	510097	
	Standard Conc(ug/ml) -	0.300	Sample Conc(ug/Kg) -	1273.12	

Analyst Comments:

.305

BLANK SPIKE

(21)

AR100367

orig.

8611-45-11

Site Name: H & H, Incorporated
TDD No.: F3-8611-45

QUALITY ASSURANCE REVIEW

Dioxin and Furan Results: SAS 2530c

Summary

Twenty-four solid samples were analyzed through the EPA Contract Laboratory Program (CLP) Special Analytical Services (SAS) for tetra- through hepta-chlorinated dibenzo-p-dioxins and dibenzofurans. Included in the sample set were 19 soil samples, 1 field duplicate, 1 background soil sample, 1 rinsate sample, 1 performance audit sample, and 1 background sample for spiking by the laboratory.

Results of these analyses are presented in attachment 1. Positive hits were only identified at 3 of the 19 field sample locations. Toxicity equivalents (TEs) have been listed for these results, based upon the most recent revision of TE factors (EPA Interim Procedures, October 1986). A worst-case approach was taken by assuming isomers were 2,3,7,8-substituted when this could not be ruled out.

The laboratory data have been fully reviewed to determine the usability of results. In general, analyses were performed in conformance to the requirements in the SAS request. (Please see attachment 2 for a description of the specific adaptations to method 8280 and associated quality control (QC) requirements.) In particular, blank analysis results, calibrations, matrix spike results, surrogate accuracy, performance audit sample results, duplicate analysis results, and decontamination rinsate analysis results were all acceptable. In addition, the time windows used to search for each homolog were verified before and after each 12-hour period of sample analysis.

The major problem in the analyses was the existence of interferences. Many samples had to be re-extracted or required additional cleanups in order to meet QC criteria. (The laboratory has reported only the results of the best analysis for each sample.) Although there were minor problems noted in some sample reanalyses, analytical results were usable (i.e., capable of determining the presence or absence of dioxin and furan toxicity equivalents down to 1 ppb) for all samples except one. In particular, the possibility of false negatives exists in sample DC017903. Recommendations for this sample and a description of the specific problems/interferences encountered are given in attachment 3. (Attachment 3 also contains a summary of minor problems and comments pertaining to other samples that are not expected to have any major impact on the usability of the data.)

The only change made to the laboratory's data in the data summary was the deletion of the positive result for TCDF in sample DC017912 due to a laboratory transcription error. Other than the problems noted above with sample DC017903, all other reported results are considered acceptable without qualification. For further information regarding this Quality Assurance Review, please see the accompanying attachments.

Report prepared by Russell Sloboda  Date: April 15, 1987
(215) 687-9510

WORKSHEET TO CALCULATE TOXICITY EQUIVALENT FACTORS (TEF)

TEFs based on the October 1986 EPA interim procedure for estimating risks of PCDDs and PCDFs.

RESULTS FOR EACH SAMPLE ARE GIVEN ON TWO LINES: The top line is the concentration of the analyte in ppb. The bottom line equates that concentration to the toxic equivalent of 2,3,7,8-TCDD.

SAMPLE ID No.	TOTAL TEF	ISOMER, HOMOLOG (TEF FACTORS) TCDD 0.01	2378-TCDD 1	PCDD 0.005	2378x-PCDD 0.5	HxCDD 0.0004	2378xHxCDD 0.04	HpCDD 0.00001	2378xHpCDD 0.001	TCDF 0.001	2378-TCDF 0.1	PCDF 0.001	2378xPCDF 0.1	HxCDF 0.0001	2378xHxCDF 0.01	HpCDF 0.00001	2378xHpCDF 0.001
DC017901																	
	0																
-02																	
	0																
-03		2.29					2.98		5.76	5.1					8.61		15.7
	0.255	0.0229					0.1192		0.00576	0.0051					0.0861		0.0157
-04		0.23													2.26		
	0.0249	0.0023													0.0226		
-05																	
	0																
-06																	
	0																
-07																	
	0																
-08																	0.54
	0.00054																0.00054
-09																	
	0																
-10																	
	0																
-11																	
	0																
-12																	
	0																
-13																	
	0																
-14																	
	0																
-15															0.21		
	0.0021														0.0021		
-16																	
	0																
-17																	
	0																
-18																	
	0																
-19																	
	0																
-20																	
	0																
-21																	
	0																
-22			4.87				5.58						4.88				
(Spike)	NR																
-23																	
	0																
-24		1.18	1.71			1.60	0.39	2.46	2.01								
(P.E.)*	NR																

AR 100370

*99 Percent Confidence Interval for 2,3,7,8-TCDD = 1.1 to 5.6 ppb

NR - Toxicity Equivalents not applicable for matrix spike and performance audit sample.

Site Name: H & H, Incorporated
TDD No.: F3-8611-45

ATTACHMENT 2: ANALYTICAL PROTOCOL

Summary

All samples were air dried, spiked with internal standards and surrogates, soxhlet extracted with toluene, put through column cleanups, and analyzed by low resolution GC/MS using selected ion monitoring. (The analysis procedure was based upon RCRA method 8280.)

Extraction

C-13 analogs of tetra- through hepta-chlorinated dibenzo-p-dioxin, C-13 analogs of tetra- and pentachlorodibenzofuran, as well as Cl-37 TCDD were spiked into every sample at a level of 2.5 ppb prior to extraction. One method blank was required with each extraction batch, and 1 matrix spike and 1 laboratory duplicate were required for the 24-sample set. (It should be noted that the air drying of samples prior to extraction was not requested; however, no significant impact on recoveries is expected.)

Cleanup

Several clean-up options were allowed; the laboratory has indicated they used dual acid and base alumina column cleanups that were repeated as needed, either during the initial extraction or again on final extracts after GC/MS analysis.

Calibration

A three-part calibration curve was employed, using one 2,3,7,8-substituted isomer from each homolog class. The relative standard deviation of the response factor (RF) was required to be less than 30 percent for all compounds. One calibration standard was required before and after each 12-hour period of sample analysis. The RFs from these analyses were required to have less than 20 percent difference from the initial calibration RFs.

Before and after each 12-hour period of sample analysis, the laboratory analyzed a standard mixture containing the first and last eluting isomers of each homolog class. These data were examined by the laboratory to verify the GC windows used for selected ion monitoring. (The descriptor windows in the draft IFB were combined in pairs in order to insure detection of any overlapping homolog classes.)

Identification

During analysis, the M, M+2, and M-COCl ions were monitored for all homologs. For penta- through hepta-CDDs and CDFs, the M+4 ions were also monitored.

The requirements for identification of a PCDD or PCDF were based upon the following criteria:

1. The S/N of all monitored ions must be greater than 2.5.
2. The monitored ions must maximize within three seconds of each other.
3. The ratio of the second largest to the largest ion in the molecular ion isotope cluster must be within ± 15 percent of the theoretical value. (In addition, for the penta- through hepta-CDDs and CDFs, the reviewer verified that the ratio of the third largest to the largest ion in the molecular ion cluster was also within ± 15 percent of the theoretical value.)
4. The retention time of a CDD or CDF must be between the earliest and latest eluting isomers identified in the GC window defining mixture.
5. For 2,3,7,8-substituted isomers, the RRT must be within 0.06 of the RRT of an authentic standard run on the same day. (The reviewer verified the RRTs of 2,3,7,8-substituted isomers to within an even smaller range, consistent with the capabilities of the chromatographic system.)

Quantitation

All results were quantitated using the average of the two response factors in the associated standards run before and after sample analysis. One ion was used for each analyte and internal standard. Detection limits were required to take into account specific interferences which had ion ratios outside identification criteria.

Reanalysis Requirements

Re-extraction or additional cleanup was required by the SAS whenever the internal standard ions were not greater than 10:1 S/N, if surrogate recoveries were not between 60 to 140 percent, if method blanks were contaminated above 0.1 ppb TCDD, or if the performance audit sample results were not within the 99 percent acceptance windows.

Reanalysis using the IFB protocol for 2,3,7,8-TCDD was required when ion current above 2.5 S/N was observed for TCDD ions within ± 10 seconds from the expected retention time, which corresponded to above 0.1 ppb estimated maximum possible concentration. A second column confirmation for other homologs was required if the TE was above 1.0 ppb.

Site Name: H & H, Incorporated
TDD No.: F3-8611-45

ATTACHMENT 3: SAMPLE-SPECIFIC PROBLEMS/COMMENTS

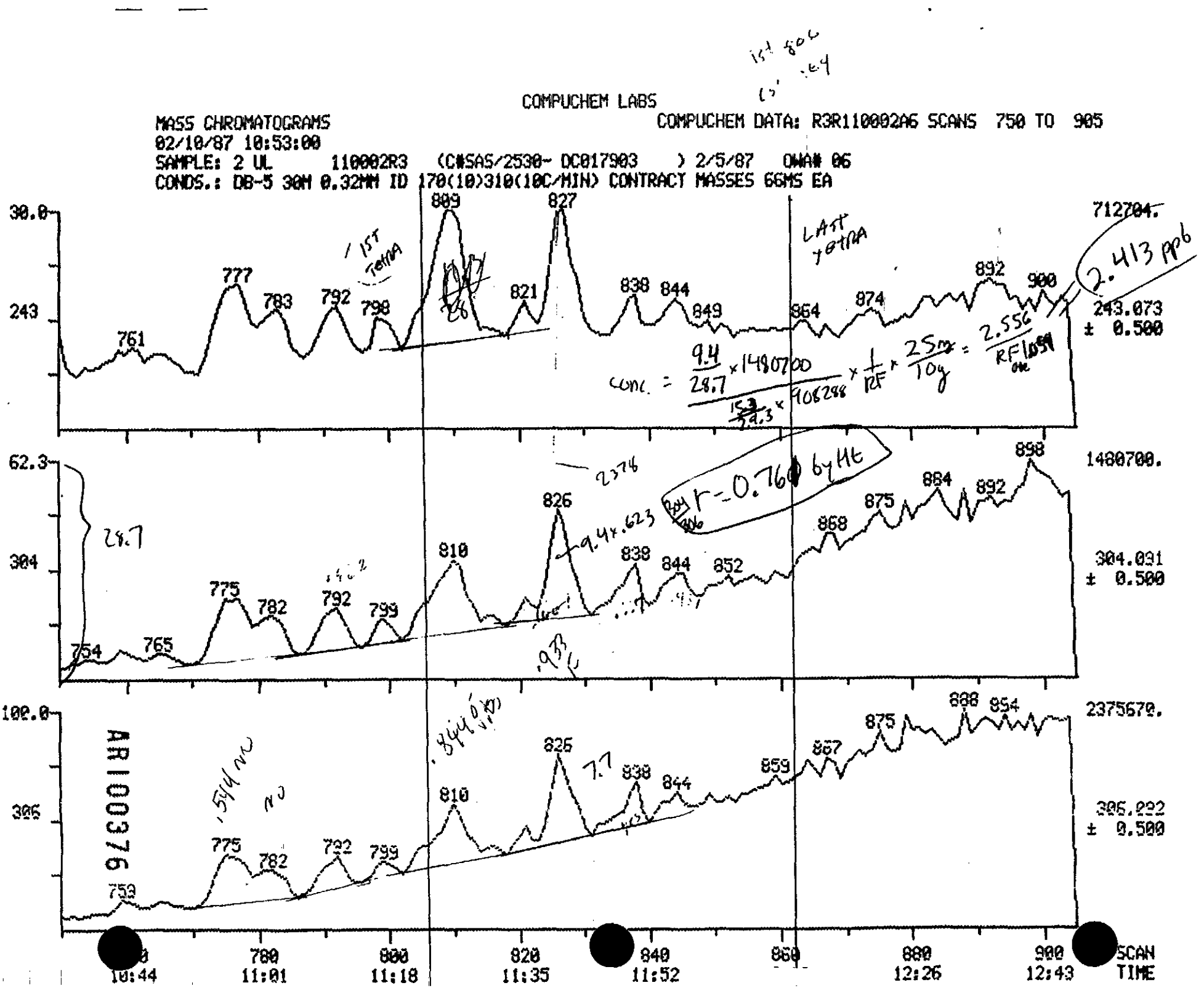
Sample DC017903 was reported to contain the highest level of dioxin and furan toxicity equivalents (0.25 ppb) from this batch of field samples. However, the possibility of false negatives exists in this sample due to several peaks outside ion ratio criteria for PCDF and TCDF. It should be noted that a possible 2,3,7,8-TCDF peak met criteria by peak height, but not peak area, whereas PCDF peaks did not meet criteria by either technique. (Chromatograms of these peaks are attached to document the ion ratios.) Based upon the estimated maximum concentration of these interfered peaks (assuming they represent TCDF and PCDF), the TE total for this sample might be as high as 1.6 ppb. If better detection limits are needed for this sample, reanalysis by high resolution GC/MS might be appropriate, since the laboratory was not able to eliminate these interferences using low resolution GC/MS, despite repeated re-extractions and additional acid and base washes and multiple column cleanups.

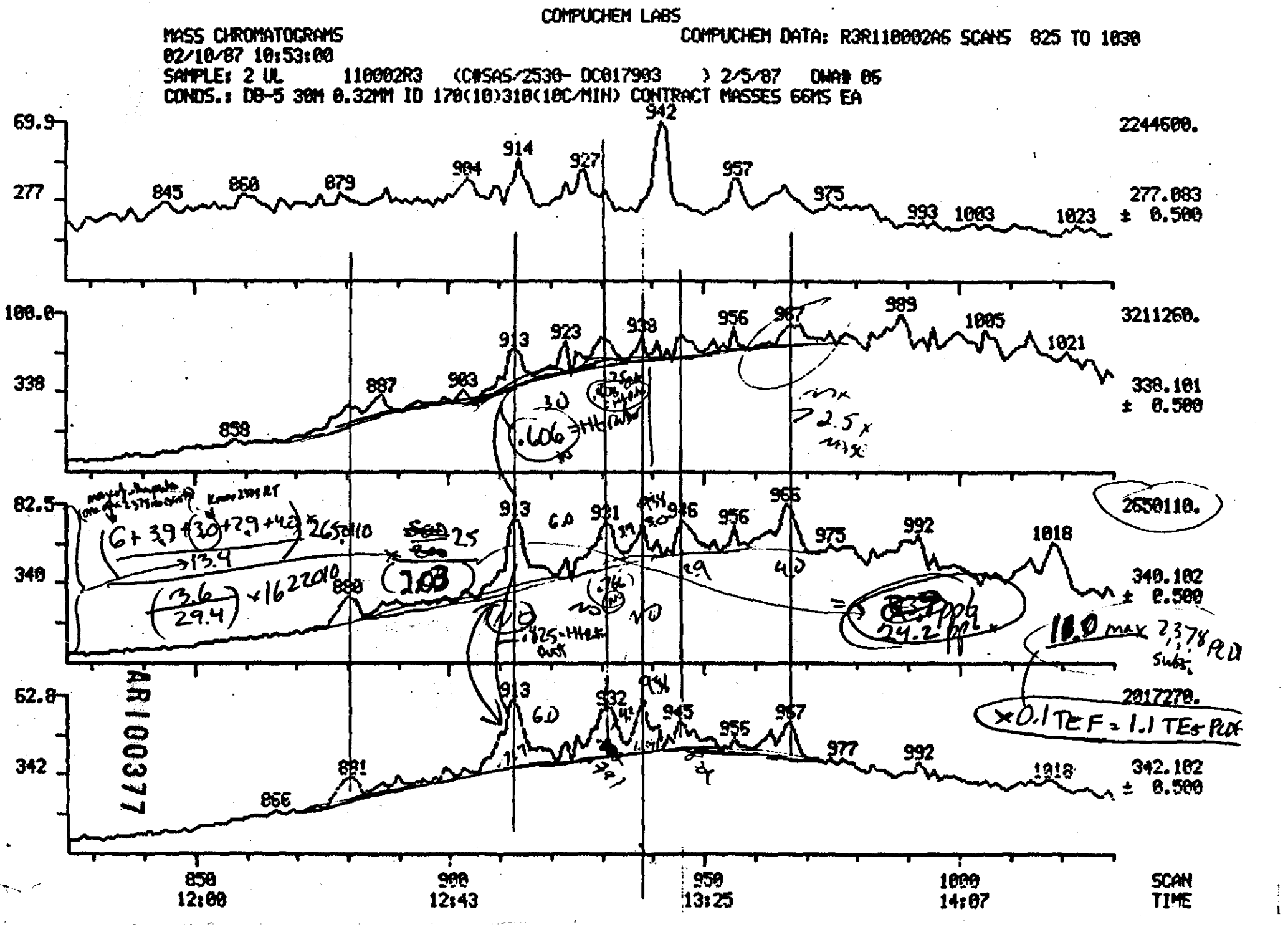
In several samples, ion ratio criteria were not met for the C-13 analogs. In some cases, but not all, criteria were met by height, but not by area (these results are attached). In all cases, except sample DC017903, the analysis was still capable of adequately determining the presence/absence of analytes down to the required 1.0 ppb TE, and accurately quantifying positive results.

Three samples were run by the IFB method for 2,3,7,8-TCDD: samples DC017903 and DC017904 were reanalyzed by this method, thereby confirming that 2,3,7,8-TCDD was not present. The performance audit sample (DC017924) was reanalyzed, confirming the presence of 2,3,7,8-TCDD.

Results for sample analytes and C_{13} analogs which are outside ratio criteria

SAMPLE I.D. # DC017-	ANALYTE OR C-13	RATIO CRITERIA	AREA RATIO (P = PASS F = Fail)	HEIGHT RATIO P = PASS F = Fail	COMMENTS/ footnotes (Detection limit still acceptable = DL OK)
-903	C_{13} TCDF	.670-.886	F 1.23	P 0.881	
	C_{13} PCDD	.553-.748	F 1.17	P 0.655	
	C_{13} PCDF		F 0.458	F can't measure accurately	High noise level - DL affected
	C_{13} HxCDD		F 0.385	P 0.808	
	2,3,7,8-TCDF		F 0.933	P 0.761	2.41 ug/kg (if present)
	2,3,7,8-PCDF		can't measure accurately, but could be criteria	with this Ratio	Several peaks near 2.5 noise level. One was at 2378 retention time
Lacid and	with DC017903 (lab indicated base washes and		corrective action; re-extraction with additional multiple		column cleanups
-912	C_{13} PCDD	.553-.748	F 1.14	F .873	High noise level for PCDD & C_{13} PCDD
	C_{13} PCDF	.552-.746	F .792	P .672	DL OK
	C_{13} HxCDD	.690-.934	F .665	F .680	
-910	C_{13} TCDF	.670-.886	F 1.09	P .836	DL OK
-904	C_{13} TCDF	.670-.886	F 1.01	P .768	OR DL
	C_{13} PCDD	.553-.748	F .917	P .666	DL OK
-902	C_{13} TCDF	.670-.886	F .930	P .813	DL OK
	C_{13} HpCDD	.828-1.12	F .810	P .899	DL OK
-917	2378 TCDF	PEAK FOUND NEAR 2.5 x NOISE LEVEL			0.19 ppb (0.019 Toxicity equiv.)
-907	C_{13} TCDF	.670-.886	F .920	P .834	DL OK
-913	C_{13} PCDD	.553-.748	F .769	P .682	DL OK
	C_{13} TCDF	.670-.886	F .939	P .811	DL OK
Following	samples (Below) were reported		from the first batch	(all samples above were re-extracted/re-cleaned)	
-923	C_{13} TCDF	.670-.886	F .898	P .816	
	C_{13} PCDD	.553-.748	F .770	P .650	
-919	C_{13} TCDF	.670-.886	F .922	P .813	
-921	C_{13} PCDD	.553-.748	F .792	P .617	
-924	HxCDD	.694-.940	F .944	P .827	Added to other 3 (Confirmation present. (LAB REPORTED AS PRESENT) (PE SAMPLE)


COMPUCHEM LABS
MASS CHROMATOGRAMS
COMPUCHEM DATA: R3R110002A6 SCANS 750 TO 905
02/10/87 10:53:00
SAMPLE: 2 UL 110002R3 (C#SAS/2530- DC017903) 2/5/87 OWA# 06
CONDS.: DB-5 30M 0.32MM ID 170(10)310(10C/MIN) CONTRACT MASSES 6GMS EA
30.0
243
712704.
243.073
± 0.500
761
777
783
792
798
809
821
827
838
844
849
864
874
892
900
1ST TOTPA
LAST TOTPA
2.413 ppb
62.3
304
1480700.
304.031
± 0.500
754
765
775
782
792
799
810
826
838
844
852
868
875
884
892
898
r=0.760
100.0
305
2375670.
305.222
± 0.500
753
775
782
792
799
810
825
838
844
859
867
875
888
894
AR100376
10:44
11:01
11:18
11:35
11:52
12:26
12:43
SCAN TIME


COMPUCHEM LABS
MASS CHROMATOGRAMS
COMPUCHEM DATA: R3R110002A6 SCANS 825 TO 1030
02/10/87 10:53:00
SAMPLE: 2 UL 110002R3 (C#SAS/2530- DC017983) 2/5/87 DWA# 06
CONDS.: DB-5 30M 0.32MM ID 170(10)310(10C/MIN) CONTRACT MASSES 66MS EA
69.9
277
845
860
879
904
914
927
942
957
975
993
1003
1023
2244600.
277.083
± 0.500
100.0
338
858
887
903
913
923
938
956
967
989
1005
1021
3211260.
338.101
± 0.500
82.5
340
880
913
921
936
956
965
975
992
1018
2650110.
340.102
± 0.500
62.8
342
866
881
913
932
945
955
967
977
992
1018
2017270.
342.102
± 0.500
AR100377
850
12:00
900
12:43
950
13:25
1000
14:07
SCAN
TIME